ATHABASCA UNIVERSITY

INTERACTION IN SATELLITE-BASED CORPORATE DISTANCE TRAINING

BY

SONJA CHAMBERLAIN

A thesis submitted to the
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The undersigned certify that they have read and recommend to the Athabasca University Governing Council for acceptance a thesis "INTERACTION IN SATELLITE-BASED CORPORATE DISTANCE TRAINING" submitted by SONJA CHAMBERLAIN in partial fulfilment of the requirements for the degree of MASTER OF DISTANCE EDUCATION.

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DEDICATION

This thesis is dedicated to my husband, Doug Chamberlain and our two children, Adam and Kristen. Without their encouragement, understanding and support, this dream of higher learning would never have been possible. It is also dedicated to my parents, Nick and Nada Zdravko, who came to Canada looking for a better life. They taught my sister, Lydia, my brother Tyrone, and me that a better life is something you build with an eager mind and a strong spirit. This thesis also honours all those corporate trainers who, tirelessly and fearlessly, seek better ways to help others succeed.

ABSTRACT

Maintaining an educated, high performance workforce has become a particularly daunting challenge in the highly volatile knowledge-based economy. A growing number of companies currently use one-way video, two-way audio satellite technology to make training more accessible to employees in different locations, shorten the time lag between course development and course delivery, and to provide real-time interaction. However, the provision for live interaction makes satellite one of the most expensive, complex and difficult of instructional technologies to implement effectively. Although the general benefits of interaction in education are well documented, few studies have attempted to apply theoretical frameworks of interaction to the substantive area of corporate distance training. This study was undertaken using the grounded theory method of qualitative inquiry. Its purpose was two-fold: to examine, through empirical data, the importance of interaction in corporate satellite training, using constructs for interaction proposed by Moore (1989), Hillman et al. (1994) and others in order to generate a theoretical framework to guide distance training practitioners; and to apply an Instructional Systems Design (ISD) approach in identifying instructional strategies for maintaining learner interest and involvement in one-way video, two-way audio satellite-based training. The study's prime focus was to understand learners' perceptions of four types of interaction and their relationship to learner satisfaction with the overall training experience. Qualitative and quantitative methods of data collection and analysis were used, including a Flanders-type interaction analysis of five satellite training sessions and semi-structured interviews with 19 learners. The study describes the defining features and instructional strategies employed in the practice of satellite training at a Bank. It discusses advantages and limitations in designing interaction in satellite training and

concludes that different types of training applications are characterized by different interaction profiles. This study identifies five factors which impact learners' motivation to participate in interactive activities and proposes a theoretical framework to allow distance training professionals control over the structure and process of interaction in satellite training.

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CHAPTER I

INTRODUCTION

Background

Advances in science, telecommunications, information processing and dissemination technologies are accelerating the rate of human knowledge (Hefzalla, 1990, in Schreiber, 1998a). This places companies under increasing pressure to update employees' skills and knowledge. Maintaining an educated, high performance workforce has become a daunting challenge in the highly volatile knowledge-based economy. An increased need for training calls for a corresponding increased organizational capacity to deliver the training. Increasingly, corporate trainers and education specialists are turning to advanced instructional technologies in their efforts to deliver more training to more employees in less time and with reduced cost. More and more, companies look to developments in communications technology to strengthen distance learning (Schreiber, 1998a).

Telecommunications technologies enable companies to delivery corporate training to larger, distributed employee populations in potentially engaging ways. Satellite-based training is one solution corporations are adopting to meet the urgent need to continually update employees' skills. A growing number of companies currently use one-way video, two-way audio satellite technology to make instruction more accessible to employees in different locations, shorten the time lag between course development and course delivery, and to provide real-time interaction (Meister, 1998; ONE TOUCH Knowledge Systems, 2001). But, as Weick points out, "technologies are not merely artifacts whose use is self-evident; they are equivocal and open to interpretation, and the interpretations organizational members ascribe to a technology influence both thinking and its use" (Weick, 1990, in

Suchan & Crawford, 1998, p. 369). Deutsch (1997, in Schreiber, 1998a) concludes that many companies procure new technologies but often do not know how best to utilize them.

Significance of the Study

Distance learning by satellite is arguably the most expensive, and the most complex and difficult of instructional technologies to implement effectively (Piskurich, 1997, p. 19-20). Specifically, it is the element of live interaction that significantly increases both the cost and the complexity of designing and delivering satellite-based training (Piskurich, 1997). The synchronous delivery that this interaction requires also places restrictions on the learner in terms of both time and place. The benefits of interaction in education are well documented in studies that show learners' perception of the general level of interaction is a critical predictor of learner satisfaction (Fulford & Zhang 1993, in Saba, 2000, p. 3). However, Saba (2000), in a review of distance education research, states that few researchers have conducted rigorous studies of interaction based on theoretical foundations of the field, or theories of fields closely related to distance education (p. 3). In addition to this, corporate training professionals also face the apparent lack of research in the rapidly growing field of corporate distance training.

In devising strategies to improve interaction, distance education and training professionals need a guiding theoretical model that explains learner motivation in technology-mediated real time interaction. This study attempted to provide such a model.

Although this study explored interaction through the analysis of courses involving one-way video, two-way audio satellite technology, it sought answers to questions that may be generalizable to other users and other videoconference-based interactive distance learning systems, using modem, ISDN lines, fiber optics or wireless technology.

Purpose

The purpose of this study was two-fold. The first was to determine, through empirical data, the importance of interaction in corporate satellite training, using constructs for interaction proposed by Moore (1989), Hillman et al. (1994) and others in order to generate a theoretical framework to guide distance training practitioners. The second purpose was to apply an Instructional Systems Design (ISD) approach to identify instructional strategies for maintaining learner interest and involvement in one-way video, two-way audio satellite-based training.

While this study incorporated the views, practices, and expert opinions of distance training professionals, its prime focus was on examining interaction, and instructional strategies for achieving it, from the learners' perspective. Does the interjection of one-way video, two-way audio satellite technology change the communication process in training? If so, how?

Research Questions

To achieve its purpose, this study used multiple methods of data collection to examine the following questions:

1. What are the defining features that constitute a paradigm of real-time interaction in one-way video, two-way audio satellite training?
2. What instructional strategies and techniques define the four types of interaction in satellite-based training?
3. What, if anything, does real-time interaction contribute to the satellite learning experience?

4. What are learners' perceptions of each type of interaction and how are these related to learner satisfaction in satellite training?
5. What advantages and limitations does one-way video, two-way audio satellite training present for designing interactivity?
6. Are different types of corporate satellite-based training applications characterized by different interaction profiles?
7. What variables influence learners' motivation to interact in satellite-based training?
8. What theoretical frameworks might guide distance training professionals in designing interactivity for satellite?

Definitions of Terms

- **Corporate training** – training that an organization provides to its employees in order to achieve strategic goals through performance improvement. Training is mainly concerned with developing the skills needed to solve problems within an already existing, well-defined system of knowledge. Thus, training is distinguished from *education*, which is aimed at broadening people's understanding in ill-defined systems of knowledge, and to problem solving outside existing models (Berge, 1998, p. 20).
- **Feedback** – is a subcategory of interaction. It is a specific type of interaction that has as its purpose the development of individual, group or organizational learning (Suchan & Crawford, 1998).
- **Flanders' Interaction Analysis System**– is an instrument originally developed by Ned Flanders to provide information about instructor and student behaviour. The instrument is used to code verbal instructor-student or student-student interactions into a number of categories based on predetermined concepts.

- **Grounded Theory** – the processes of research, based on a general method of comparative analysis, for generating theory; the discovery of theory from data systematically obtained from social research. Such a theory must "work," i.e., it must provide us with relevant predictions, explanations, interpretations and applications that fit empirical situations; and it must be understandable to sociologists and layman alike (Glaser & Strauss, 1967, p. 1-3).
- **Instructors** – staff or externally contracted training professionals at *Learning & Development* (i.e. the financial institution's training department) who have delivered at least 5 training courses using satellite technology in the past 2 years.
- **Interaction** – is a concept linked to communication and central to conceptualising the process of teaching and learning (Saba, 2000, p. 4). For the purposes of this study, the construct of interaction is defined in terms of:
  - Moore's concept of three types of interaction: Learner-Content, Learner-Instructor and Learner-Learner (Moore, 1989); and,
  - Hillman's concept of Leaner-Interface interaction (Hillman et. al., 1994).
- **Interactivity** – the process by which interaction is achieved (e.g., the process by which two individuals act upon each other, reciprocally). Interactivity also refers to the extent to which instructors and learners observe and respond to one another's communication cues.
- **Interpersonal presence** – is the media's ability to communicate the personal feelings and emotions that accompany many face-to-face communication interactions (Suchan & Crawford, 1998).
- **Learners** – for the purposes of this study, learners are operationally defined employees (management and pre-management) working in the retail banking business of the

Financial Group of Companies, who have attended satellite-based courses within the past two years.

- **Learner-Content interaction** – the process by which the learner intellectually interacts with the content of the subject of study to produce changes in the learner's understanding, perspective or cognitive structures (Moore, 1989, p. 2). Moore considers this to be a defining characteristic of education.
- **Learner-Instructor interaction** – the process by which the learner interacts with the instructor or "expert" who prepared and/or presents the subject material. The prime purpose of this type of interaction is to present content, as well as to motivate and maintain the learner's interest and attention (Moore, 1989, p. 2). According to Moore, this type of interaction is regarded as essential by many educators and highly desirable by many learners.
- **Learner-Learner interaction** – refers to inter-learner interaction, between one learner and other learners, alone or in group settings, with or without the real-time presence of an instructor (Moore, 1989, p. 4). Moore maintains that Learner-Learner interaction is an extremely valuable resource for learning, and is *sometimes* even essential (p. 4).
- **Learner satisfaction** – for the purposes of this study, "learner satisfaction" was defined as the degree to which learners were satisfied with the satellite training session. Learner satisfaction was measured through learner responses collected on reaction evaluations to the following question: "How would you rate this satellite session overall?" Learners responded using a Likert scale comprised of: 1) Poor; 2) Fair; 3) Good; and 4) Excellent. Learner responses were collected and tabulated by *Learning & Development* department. For the purpose of analysis, learners who assigned a rating of "good" or "excellent" were

assumed to be satisfied with their satellite training experience; learners who assigned an overall rating of "poor" or "fair" were assumed to be dissatisfied with their satellite training.

- **Media richness** – is the degree to which a medium supports the various components of interactivity. There are three interrelated factors determining the relative "leanness" or "richness" of media (Suchan & Crawford, 1998, p. 370):
  1. The capability of the medium to support various levels of verbal and non-verbal interactivity;
  2. The type and timeliness of feedback a medium can provide; and,
  3. The relative degree of perceived interpersonal presence that the media can provide.
- **Medium (plural, media)** – is a channel of communication that is defined by its technology, symbol systems and information processing capabilities (Kozma, 991, p. 180). Medium typically refers to any technology that facilitates communication by carrying information between a source and a receiver. When the messages have an instructional purpose the mediating technology is described as an "instructional medium" (Heinich et al., 1996, p. 8).
- **Medium usability characteristics** – describes the unique capabilities, strengths and weaknesses of a technology for facilitating communication in distance training (Suchan & Crawford, 1998, p. 370).
- **Point-to-multipoint teleconferencing** – a mode of distance education delivery in which the instructional messages originates as a video and audio signal from one central point (e.g., a broadcast studio) and is transmitted to multiple locations that receive the message signal in real time, through the mediation of telecommunication technology.

- **One-way video, two-way audio technology** – a type of point-to-multipoint teleconferencing that enables learners at distant sites to see and hear an instructor, in real time, through a TV monitor. The instructor, broadcasting from a studio location, cannot see learners at distant sites. However, two-way audio communication between the instructor and learner is possible through a device that creates an audio link between the studio and the distant site, usually using telephone lines.
- **Satellite** – a orbiting device in space that functions like a mirror 23,000 miles above the earth, allowing telecommunications signals broadcast from a central site to be re-transmitted down to all "receiving" sites that tune in to the satellite's signal. All tuned-in sites receive the broadcast message simultaneously, in real time, regardless of time zone.
- **Satellite-based training** – for the purposes of this study, satellite-based training is defined as instruction that is delivered by corporations, government agencies and non-profit organisations, through point-to-multipoint teleconferencing, employing one-way video, two-way satellite technology.
- **Theory** – a theory, according to Glaser and Strauss (1967) goes beyond description of a phenomenon to predict and explain behaviour. It is usable in practical applications, giving practitioners understanding and some control of situations (p. 3).

Context for the Study

The satellite learning network of a major financial institution (hereafter referred to as the Financial Group of Companies) and the satellite training programs developed by its *Learning & Development* department (i.e., its training department) provided the context for this study. This financial institution was a suitable context for this research because it is representative of corporations that utilize distance learning systems to provide solutions to complex

organizational challenges.

Definition of Grounded Theory

The methodology used in this study was based on the grounded theory method of qualitative research and analysis introduced by sociologists Barney Glaser and Anselm Strauss in 1967. Grounded theory, which derives its name from the practice of generating theory from research which is "grounded" in data (Babchuk, 1996, p. 1), seeks to discover theoretical statements that describe phenomena, and ultimately to construct complex theories based on empirical evidence. This methodology relies on the *inductive* discovery of theory grounded in systematically analyzed empirical data. It emerged as an alternative strategy to the more traditional methods of scientific inquiry; that is, *deductive* approaches to theory testing through an emphasis on hypothesis testing, verification techniques and quantitative forms of analysis (Babchuk, 1996).

Haig (1995) traces the theoretical underpinnings of grounded theory methodology to the related movements of American pragmatism and symbolic interactionism. He portrays this method of inquiry as a problem-solving endeavour concerned with understanding a phenomenon from the perspective of the human agent (p. 1). For the purposes of this study, the *phenomenon* is defined as interaction in one-way video, two-way audio satellite-based corporate training; the human agent is defined as the distance learner. The sequence of chapters in this study follows a theory-building logic, applying the grounded theory method of data analysis.

Delimitations

This study was delimited to five satellite training courses offered by the domestic bank, a separate corporate entity operating within the Financial Group of Companies. In addition,

interviews were conducted with 19 of the bank's employees who had participated in one or more of three different sessions of the same satellite training program (Portfolio Management I, II and III) within the past six months from the date on which their interview data was collected.

Limitations

The data collection methodology employed for this research focused on the in-depth examination of one phenomenon of distance training – interaction, across a limited number of participants selected by virtue of their being employees of one organization utilizing satellite training. The representative sample of interview participants was further limited by the availability of participants who were articulate and approachable. Given this narrow focus, this study may be judged as limited in its representativeness; not allowing valid generalizations to the universe of distance learners who participate in satellite-based corporate training. However, while the grounded theory approach does not permit generalization to other populations and universes, it does allow generalization to *theoretical propositions* where the researcher's aim is to identify or expand a theoretical framework (analytic generalization) and not to enumerate frequencies (statistical generalization) (Yin, 1984, in Lawry, 1986, p. 12).

This study may be limited in its substantial reliance on qualitative data gathered through interviews. The retrospective nature of the interview method "introduces memory errors and contamination because of intervening events and biasing factors which increase with time" (Isaac & Michael, 1981, in Lawry, 1986, p. 41). Furthermore, data obtained through interviews is "reactive" in nature; that is, the interview directly involves the subject in the assessment process by eliciting a reaction (Isaac and Michael, 1981, in Lawry, 1986, p. 41).

The risk of relying on reactive measures is that the interview may produce "artificial or slanted" responses, or that the characteristics of the interviewer (e.g., gender, appearance, speech pattern etc.) will interact with the attitudes or expectations of the subject (Lawry, 1986, p. 41). In commenting on this limitation, Wolcott (1997) writes:

> In the participant observer role, ethnographers let the field parade before them. In the interviewer role, ethnographers take a critical step in research that can never be reversed – they *ask*. And regardless of whether they ask "How's things?," the sum of nine plus eight, what someone "sees" in a set of inkblots or drawings, or for someone's life story, they have imposed some structure upon the setting (p. 337).

Another limitation arises in assessing the historical data. I cannot attest to the accuracy of any archival data, such as learner reaction evaluations, collected by the *Learning & Development* department and used in this study. These data were not collected with research in mind therefore it is difficult to determine the care that was taken in their collection and reporting.

A further limitation in this study was my involvement and familiarity with the operations of the Financial Group of Companies' *Learning & Development* department, and satellite as an instructional medium. I was an employee of the Financial Group of Companies from February, 1981 until June, 2000, working in the training department for the last 14 years of my employment. Consequently, I was the project manager, instructional designer and developer of all of the satellite training programs examined in this study. It is possible that this involvement may interfere with my ability to faithfully render data gathered without interpretation. Wolcott (1997) notes that observer bias is a common criticism in qualitative methods of inquiry in which the researcher is the "research instrument." However, familiarity with the context and subject matter under study carries a particular risk, as described by Wolcott:

> ...there is probably no single factor that poses a greater threat to realizing the potential of ethnography than this problem of the researcher who already knows, without ever having to ask, what the "native's view" is – or ought to be. There are unique problems to be faced in doing ethnographic research in settings already familiar and where our subjects are *us* rather than *them* (p 338).

In this study, I have attempted to mitigate the limitation of observer bias and strive for objectivity in research in a number of ways:

- This study does not examine learner interaction from the all-too-familiar, training practitioner's perspective, but rather seeks to understand this phenomenon from the *learner's* perception; that is, "to grasp the native's point of view, his relation to life, to realize *his* vision of *his* world" (Malinowski, 1922, in Wolcott, 1997, p. 338).
- A multi-instrument approach was used to gather information from multiple sources rather than relying solely on one method.
- I continually compared findings in qualitative and quantitative data analysis, looking for corroborating evidence that might support the validity of those findings.
- Interpretations of key patterns and themes that emerged through data analysis were described and confirmed with certain interview participants, to verify that such interpretations adequately described the social and psychological dimensions of the interaction from the learner's perspective.
- Emerging concepts were shared and discussed with colleagues and laypersons in order to introduce multiple perspectives to understanding the research problem.
- And, perhaps most importantly, this research was undertaken in the spirit of intellectual flexibility; guided by a genuine desire to "understand" the social phenomenon of learner

interaction in satellite distance training. Its intent was not to justify or champion predetermined training practices and approaches.

Assumptions

The following assumptions were fundamental to the purpose and design of this study:

1. Interaction has important implications for learner satisfaction in distance training.
2. Corporate training must be conceptualized as a social system. To understand phenomena associated with training and learning requires a systems perspective that recognizes the complex connectedness of multiple variables and components.
3. Social systems have intensive interactions with their environment that result in changing goals and ways of doing things (Banathy, 1992, p. 6). For this reason, corporate training, as a social system unique to its environment, is qualitatively different from other educational systems (i.e., colleges and universities) in approach and practices related to distance education. Approaches and practices that may be effective in one type of system may not be appropriate in the other.
4. Interview participants are able to articulate their own experiences with satellite-based training, and, furthermore, are able to reflect upon that experience in order to suggest how interaction in satellite-based training might be enhanced.

CHAPTER II

LITERATURE REVIEW

Introduction

This chapter begins with an attempt to define and briefly describe the paradigm of corporate distance training using the Financial Group of Companies as a case of practice. It then describes advanced telecommunications technologies that make corporate training at a distance possible, and their implications for the field of distance education and training. Specifically, this chapter examines the use of instructional television in distance education and training.

The discussion then explores the concept of interaction in distance education and its relationship to learner satisfaction, using constructs suggested by Moore (1989), Hillman et al. (1994) and others. Literature dealing with media and learning is also discussed to provide further insight on the suitability of satellite as an instructional medium.

General Observations Concerning the Literature

Piskurich (1997) emphasizes that instructional satellite is arguably the most complex and difficult of the distance learning technologies to implement effectively. He states that individualized text-based and technology-based distance learning require strong design and development expertise, careful planning and significant time to implement properly. Likewise, computer-mediated distance learning requires experienced, well-prepared instructors who can "think on their feet." Satellite mediated distance learning in an interactive live broadcast, Piskurich maintains, requires all of the above, and more (p. 20).

A recurring theme in the literature is that distance education professionals who hope to

optimize the effectiveness of satellite-based training must methodically and systematically consider strategies for incorporating interaction in their courses. However, according to Thach (1995), much of the literature describing the instructional use of satellite focuses on the need for visual and action-oriented formats, thus reflecting the "TV production mentality" (p. 107). Relatively little in the literature concerning satellite addresses the need for distance education principles of interaction and how these might be incorporated into satellite-based instruction. Thach (1995) and Keegan (1996) contend that the literature provides little guidance to distance education practitioners in this regard. This is particularly true in the area of corporate distance training since even less research reflects the unique goals and functions of this organizational environment.

Lewis (1995) notes that although distance learning has been increasingly employed by both public and private organizations since the early 1980s, this trend has rarely attracted the interest of researchers (p. 242). The majority of literature focuses instead on understanding the factors and practices impacting the phenomenon of satellite distance learning in formalized *educational* systems rather than *corporate training* systems. However, Banathy's (1992) Systems-Environment Model emphasizes that a "human activity system" is a purposeful creation that has a unique and interdependent relationship with its environment (p. 12). According to Banathy's model, a satellite distance learning system is a type of social system that has an intensive interaction with its environment. This relationship, in turn, defines the system's goals and ways of doing things (p. 6). For this reason, corporate training, as a social system unique to its environment, is qualitatively different from other educational systems, such as colleges and universities, in its approach and practices related to distance learning. Consequently, one must approach with a degree of scepticism any

assumption that study findings and recommended practices pertaining to satellite-based instruction in *educational* systems necessarily apply to the substantive area of corporate training. For example, Thach (1995) reports that informal discussion with ten adult learners who were taking a satellite course verified that visuals and interaction were very important to them (p. 100). To what extent can these findings be generalized to satellite courses of 200 or more participants per session, which is the average audience size of a satellite training broadcast at the Financial Group of Companies? What impact might large training audiences, a common feature of corporate satellite training, have on interaction? Also, many of the examples of instructional satellite cited in the literature describe university courses in which the instructor "teaches to" a live studio audience while learners in distant sites "look on" (Buckenmyer et al., 2000; Frost, 2000). Typically, corporate satellite training is not conducted in the presence of a live studio audience. Would it be reasonable to assume that the presence of a studio audience might significantly change the dynamics of interaction?

Distance training professionals will also find that much of the literature dealing with interaction in satellite-based courses is primarily concerned with perceptions from the perspective of the instructor, rather than the learner (Keegan, 1996). Furthermore, as Keegan points out, many of these studies are coloured by such factors as the nature of the distance education institution offering the training, differing educational philosophies and the personal teaching preferences of instructors. Consequently, it is not surprising to find that the literature presents a bewildering, and at times contradictory assortment of "best practices" to guide design and delivery in instructional satellite. Few studies, however, report on the issue of interaction in satellite-based learning from the distant learner's perspective, as is the intent of this study.

The Need for Corporate Training: The Case of A Canadian Financial Institution

Reporting on US statistics, Schreiber (1998a, p. 3) describes an evolving workforce crisis in which four out of ten employees require some form of retraining to meet the demands of a changing economy. Increased competition, new requirements by regulatory bodies, changing technology, and process reengineering are disrupting jobs and the capabilities of employees who perform them. At the same time, industries and companies are restructuring as whole economies shift from manufacturing-based to service-based industries. Companies are experiencing one of the fastest rates of transition with respect to organizational change (Schreiber, 1998a, p. 11). Mergers, acquisitions and other market forces promoting globalization are giving rise to larger companies with larger, more geographically dispersed employee populations.

The Canadian financial institution (herein referred to as the Financial Group of Companies) examined in this research is a leader in the North American financial services industry. The Financial Group of Companies is made up of over thirty diverse and virtually autonomous businesses that cover a broad range of financial products and services, including retail banking, securities, trust services and insurance. In addition to dominating the Canadian financial services marketplace, its international operations span to financial markets in the USA, Europe and Asia. This multifaceted corporation is typical of large, complex organizations operating in a business environment characterized by increased competition, rapidly changing technology and process reengineering. In the past two decades, this financial institution has undergone (and continues to experience) dramatic restructuring, shaped by forces of deregulation, globalization, and mergers and acquisitions – all of which have resulted in a larger and more geographically distributed employee base.

In 2000, the retail bank (hereafter referred to as the Pre-merger Bank), representing a foundational, domestic business within the Financial Group of Companies, merged with a major Canadian trust company (hereafter referred to as the Trust Company) to form a new banking entity (hereafter called the Bank). This merger, in addition to being the largest financial transaction in Canadian history, effectively increased the financial institution's employee base from 45,000 employees to approximately 70,000. The Bank is now the largest of the Financial Group of Companies' businesses, with approximately 40,000 employees at over 1,200 branch locations across Canada.

The bank–trust company merger launched a massive effort of organizational change and integration that was expected to take two years. From the beginning, employee training and skill development was recognized as a critical component for the success of this merger. In addition to the merger, other forces of change, internal and external to the Bank, are also increasing the need for employee redevelopment. As organizational hierarchies become "flatter," jobs are being redefined and traditional boundaries between job responsibilities are becoming blurred. Organizational structures within the Bank are being redrawn in terms of broad job "families." The cumulative effect of all of this organizational change means that larger segments of the Bank's already increased employee population will now require similar training programs, at the same time.

The emergence of a "knowledge economy" has created an urgent need for companies like the Bank to update employee skills in response to new opportunities, new competition and new technology (Meister, 1998, p. 52). The short shelf life of knowledge is a chief concern for financial services companies and is the driving force behind efforts to continually re-tool employees' skills through training. Meister (1998) reports that companies no longer

view training just as a way to help employees acquire a "smorgasbord of new skills"; rather, they view learning as a means to achieve strategic goals and performance improvement (p. 52).

Today's business environment is certainly one of increased need for training and lifelong learning, but at the same time it is also one of increased competition and finite resources. Limited training resources, measured in both time and money, are forcing companies to improve the efficiency and effectiveness of their training. Employees feel the pressure of competing forces; they need to learn more, and yet, due to increasing demands for improved productivity, they have less available time in which to learn it. The idea of employees primarily coming to a face-to-face training course is becoming virtually obsolete at the Bank. In response to the daunting task of maintaining an educated, highly skilled workforce with relatively diminishing resources, organizations like the Financial Group of Companies are increasingly turning to distance learning technologies to provide efficient and effective training.

Training at a Distance

Schreiber and others observe that there has been an explosion of interest in the use of distance learning technologies to deliver corporate training (Duning, 1996; Schreiber, 1998a). In particular, company trainers and educational specialists are looking to developments in communications technology to strengthen distance learning provision. Schreiber concludes that after a century of dramatic change and innovation, telecommunication technologies, such as satellite, are ideally poised to support significant improvement in the interactivity, collaboration and real-time delivery of distance training (Schreiber, 1998a, p. 11).

The increased demand for training, escalating travel costs, and employees' growing personal and professional aversion to travel prompted *Learning & Development*, the Financial Group of Companie' training department, to explore distance education solutions in addressing training needs. Since 1994, *Learning & Development's* operations can best be described as a "learning laboratory." Over the years, this department's pioneering spirit encouraged designers and developers to explore and experiment with new instructional design methods and innovative learning technologies. With amazing speed, training solutions were developed, piloted and implemented for a variety of technology platforms, including CD-ROM, audio conferencing, video conferencing, satellite and Intranet.

According to Schreiber, deciding what technology to use and how to use it effectively rank as the two biggest questions faced by organizations attempting to design and deliver distance learning (Schreiber, 1998a, p. 6). Schreiber identifies four stages of capability that organizations like the Bank may experience when using technology to support distance learning (Schreiber, 1998a, p. 12):

- **Stage I.** The organization is just beginning to implement distance learning and delivers separate and sporadically planned distance education and training events. The application of distance training is fragmented. Each event is sponsored and financed by an individual function or department with little or no communication or coordination between separate areas of the organization initiating the training.
- **Stage II.** Distance training events are repeated or duplicated by the organization. The organization is now considered somewhat experienced with distance training. It forms an interdisciplinary team to respond to the organization's need for distance training events.

- **Stage III.** The organization understands media usability characteristics (strengths and weaknesses of various delivery tools) and correlates instructional materials development to usability characteristics in order to maximize the utilization of a technology. The organization establishes organizational policies and procedures regarding distance training.
- **Stage IV.** The ultimate capability stage for implementing distance training is reached when the organization successfully institutionalizes its efforts in distance training. Its distance training policies and procedures are driven by organizational vision and mission. Subsequent distance training events and programs are recognized for their strategic contributions to business needs.

In terms of Schreiber's four stages of organizational capability in supporting distance learning, the Bank is typical of an organization that operates at a Stage II. Today, *Learning & Development* is a department of approximately fifty training professionals, organized according to the principles of specialization and division of labour that are typical of distance education enterprises. Distance learning events are regularly offered by *Learning & Development* interdisciplinary teams in response to perceived organizational needs. Feedback systems are in place to drive continual improvement and develop the organization's capacity for distance training. However the Bank has yet to articulate clearly defined distance learning policies and procedures aligned to the organization's vision and mission.

Conceptual Frameworks in Corporate Distance Training

The current paradigm of corporate training is based on conformity and compliance (Reigeluth, 1996). According to Berge (1998), training is mainly concerned with developing the skills employees use to solve problems within an already existing, well-defined system of

knowledge. This characteristic distinguishes training from education, the purpose of which is to broaden an individual's understanding to problem solving *outside* existing models and with ill defined systems of knowledge (p. 20).

Berge (1998) describes two major frameworks from which to view distance training: the transmission model and the transformation model (pp. 20-21). In the transmission model, content and knowledge determined by someone else is *transmitted* to the learner through electronic lecture, textbooks, training manuals, videotape etc. A key underlying concept is that it is possible for the instructor to transmit a fixed body of information to learners. In this model, the primary goal of training is to transmit the expert knowledge of the instructor to the more novice learner. The transmission model is based on behaviourist principles that emphasize instructional objectives, learner competency, a focus on job context, the role of an expert instructor, and behaviour changes in which new behavioural patterns are repeated until they become automatic (Berge, 1998, p. 20). In distance training, this model is manifested in courses which require the learner to interact with pre-packaged content as a response to stimuli provided by the instructor. Berge (1998) describes this type of training as didactic, often linear, "recipe-type," workbook focused and instructor-centered (p. 21).

In the transformation model, the learner *transforms* information, generates hypotheses, and makes decisions about the knowledge he or she is constructing through interpersonal communication with others (Berge, 1998, p. 19). This model is characterized by principles of constructivism in which the active participation and reflection of the learner is thought to be critical. The model emphasizes the dynamic nature of knowledge, the value of multiple perspectives and the importance of social interaction in learning. Berge (1998) describes distance training under this approach as more tentative, flexible, incorporates multiple

perspectives, and more learner-centered (p. 21).

Berge (1998) cautions that to embrace one of these paradigms does not mean one should reject the other. For Berge, the predominant factor overarching the two philosophical approaches of the transmission and transformation models in practice is the degree to which the training is instructor or learner-centered (p. 24). Distance training may be designed as transmission of pre-packaged knowledge or it may be more flexible, organic and customized to the individual learner. Schreiber (1998b) states that:

> successful distance training occurs when instructional events compliment or reinforce a selected model for learning. For example, if the goal of the distance training event is to improve information transformation, an instructional strategy must be developed that facilitates social interaction and constructivist learning (p. 52).

In practice, Berge reports that the characteristics of distance training interventions tend to be determined by the relative value designers and instructors place on the two overarching frameworks rather than the goals of the instructional event. Berge (1998) observes that a large amount of training involves an information transmission model which corporate trainers appear to value for its "efficiency and effectiveness" (p. 20).

Applications in Corporate Distance Training

Schreiber and Berge (1998) describe three types of applications in corporate distance training:

1. **Information Dissemination and Knowledge Building**. The first type of training is concerned with the dissemination of information and the increase of knowledge. Training occurs in content related to marketing information, operational processes, new business regulations, and health and safety techniques.

2. **Critical Thinking and Technical Skill Building.** The second type of training addresses the development of intellectual skills, motor skills and interpersonal and communication skills and focuses on the application of rules, analysis and problem solving.
3. **Attitude Change and Motivation Enhancement.** Attitudes describe a personal or emotional perspective, preference or value. The third type of training is designed to change employees' attitudes or enhance motivation for what the organization has identified to be desired behaviours.

According to Schreiber and Berge (1998), the simplest type of training to facilitate at a distance is the dissemination of information and the increase of knowledge. Consequently, this is the most common type of application in corporate distance training. However, with the advent of improved distance learning technologies and instructional strategies, Schreiber and Berge (1998) report that applications aimed at building technical and critical thinking skills are becoming increasingly successful (p. xxi).

Schreiber and Berge (1998) provide a useful framework for understanding different corporate training applications; however, in practice most corporate training programs need to include elements of all three types of applications. To the extent that the transference of learning to on-the-job performance is a critical outcome, corporate training programs need to link increased knowledge with the technical and critical thinking skills needed to produce desired performance. And, to the extent that attitudes guiding social and organizational behaviour may affect performance, training programs need to affect attitudinal change in situations where personal and business perspectives are adversely affecting business results.

The Use of Instructional Television in Distance Education and Training

Instructional television was introduced to education during the late 1940s with great

expectations for the potential of the new technology as an educational medium. Early applications offered a one-way medium for disseminating information and were initially embraced by progressive educators. In 1961, the Educational Media Study Panel optimistically declared that "the new media and devices now available to education hold as much promise for improvement of instruction as did the invention of the book" (Zugner, 1987, p. 3). However, the strengths and weaknesses of television as an instructional medium were not well understood, and early efforts to adapt this technology to distance education were disappointing (Schreiber, 1998a, p. 6). As a result, broadcast courses were often poorly produced, offered at odd times of the day and night, and incorporated minimal or no interaction in their design (Ivey, 1988, in Schreiber, 1998a, p. 6). Despite their initial promise, Duning (1996) reports that applications of televised video technology have not been a priority in education (p. 212). According to Schreiber (1998a), educational television became simply a delivery medium rather than an instructional medium, eventually to be replaced by independent viewing of videotaped programs (p. 6).

The satellite era in education began with the launch of the first satellites for educational use in 1974 (Duning, 1996, p. 210). However, as Duning points out, educators may have a long-standing affection for change, but they seem "reluctant to tie the knot" (p. 210). She notes that higher education institutions in general show little enthusiasm for introducing the *fundamental change* that satellite technology represents in their way of doing things. The following institutions are exceptions to this and currently offer satellite learning in their extension programs: Indiana University, Arizona State University, Colorado State University, Iowa State University, Penn State University, Illinois Institute of Technology, University of Maryland, University of Minnesota, University of Wisconsin and University of Southern

Carolina.

Although educational institutions seem reluctant to adopt satellite technology, the benefits of this medium for corporate training are clear. As a form of distance learning, instructional satellite can reduce the costs of training (Graham & Wedman, 1989; Matthews & Reiss, 1995; Frost, 2000), making it more accessible to more employees (Meister, 1998; Schreiber & Berge, 1998). Satellite allows the organization to provide training to geographically distributed groups of employees faster than conventional training methods (Moore & Kearsly, 1996; Schreiber & Berge, 1998; Schreiber, 1998c; Suchan & Crawford, 1998). And, it can be used to deliver a consistent message, interactively and in real time. Satellite also has the potential of shortening the lag time between course development and course delivery, enhancing the organization's ability to keep pace with organizational and technological change (Schreiber & Berge, 1998). For these reasons, it is not surprising to find that the concentration of effort and resources applied to instructional satellite has been much greater in corporate training than mainstream education (Moore, 1988, in Duning, 1996, p. 215).

Duning (1996) reports that business-related applications have had a catalytic effect on the use of satellite as an instructional technology. She writes that "fundamental changes in distance education are approaching with lightening speed, fostered less by the traditional distance education community than by a dazzling array of professionals who equate distance education with telecommunications-delivered training and instruction" (p. 210).

Today, most major computer manufacturers have their own satellite networks, including Apple, Amdahl, IBM, Hewlett-Packard, NCR, Tandem, Texas Instruments and Wang Labs (Duning, 1996; http://www.onetouch.com). In the automotive industry satellite networks link

workers at company dealerships to Ford Motor Company, General Motors Corporation, BMW and DaimlerChrysler. Retailers such as J.C. Penney, K-Mart, Saks and Sears Canada Inc. also have growing satellite networks. In Canada, the Human Resources Development Corporation (HRDC), the Federal Post Office, TD Bank Financial Group, RBC Financial Group, and Shopper's Drug Mart, all use satellite-based training to provide instruction to hundreds of thousands of employees (http://www.onetouch.com).

A Changing Definition of Distance Education

Jeffries (2001) states that considerable debate surrounds the discussion of how distance education is best defined or differentiated from other forms of educational approaches. Barker et al. (1996) observe that efforts to define the concept of distance education remain inconsistent, and in many cases dated and incomplete. This is particularly true where distance education continues to be linked to correspondence study, whereby the student:

- Is physically separated from the instructor;
- Is separated in time from the instructor, and,
- Learns independent of face-to-face contact with the instructor or with other students.

Barker et al. (1996) argue that the introduction of telecommunications technology to distance education necessitates a restructuring of this definition because it enables synchronous communication between geographically-separated instructor and learners. Alluding to the influence telecommunications technologies are having in the field of distance education, Barker et al. (1996) note that:

> the term 'distance education' is now used more frequently by educators and legislative policy makers to refer to the simultaneous telecommunicated delivery of instruction from a host site or classroom to distant sites, coupled with live audio and/or video interaction between teacher and student(s) (p. 40).

Berge (1998) maintains that while distance education is not new, the major reason it is currently receiving attention from trainers and educators is due to the technological ability to mediate synchronous interaction among and between learners and instructor (p. 30). Consequently, Garrison and Shale (1987, in Barker et al., 1996) call for a broader definition of distance education; one that clearly articulates the inherent strengths that new technologies bring to the field. Jeffries (2001) notes that although some educational technologists have come to view distance education as "inexorably linked to the technology," Shale's definition of distance education (1988, in Jeffries, 2001) emphasizes the "dialectical relationship between teacher and student" (p. 3). According to Shale, this relationship is the foundational principle in the educational process.

As the field of distance education and its defining conditions become more and more synonymous with delivery via telecommunications technology, Duning predicts that the asynchronous forms of educational provision, such as correspondence instruction, will be relegated to a field separate from "distance education" (Duning, 1996, p. 215). Barker et al. (1996) already differentiate between these two forms of distance education on the basis of the instructional technology's capability to support synchronous interaction. These authors propose a categorization of distance education methodologies in the form of a taxonomy intended to compare correspondence-based distance education approaches with telecommunications-based approaches. The basis of this taxonomy is learner-instructor and learner-learner interaction (p. 40). This concept of "interaction" is therefore a defining factor in a broader definition of distance education.

This study aims to contribute to our understanding of a broader definition of distance education by focusing on the critical construct of "interaction" in satellite training – a

telecommunications technology which according to Barker et al. (1996) is becoming synonymous with the field of distance education.

Understanding Interaction

To interact means to "act upon one another" or to "act reciprocally" (Webster's New Collegiate Dictionary); in everyday usage the term "interaction" refers to conversations between people (Daniel & Stroud, 1980, p. 276). The idea that interaction is integral to learning is one that is rooted in the tradition of Socratic dialog and reinforced by modern theories of cognitive and perceptual psychology (Neisser, 1976; Gardner, 1985, in Lehman & Dewey, 1998, p. 228; Miller, 1993, in Siantz & Pugh, 2001, p. 2). Educators have long realized the role of active participation in learning. In the early 1900s, John Dewey emphasized the importance of interaction when he urged reorganization of public education curriculum and instruction to make student participation a central part of the learning process (Heinrich et. al, 1996, p. 50).

More recently, educational psychologists, focusing on the internal mental processes of cognitive development, also support the principle that effective learning demands active manipulation of information by learners (Heinrich et al., 1996, p.51). Cognitive theories of learning seek to understand interaction that takes place *within the mind* of the learner; that is, understanding the cognitive processes by which stimuli registered in the learner's short term memory interact with the existing schemas of long term memory to produce new knowledge. Current research in the area of human information processing suggests that an adult can maintain between five to nine units of information in short-term memory. Without repetition, or some other instructional activity which prompts the individual to relate the pieces of information to other personal knowledge, the new information is essentially lost in 15 to 30

seconds (Miller, 1993, in Siantz & Pugh, 2001, p. 2).

Some scholars conclude that the need for interaction in education and training is so well documented that it is "practically a given" (Hillman et al., 1994). Others, like Lane (2001) question our understanding of this concept, claiming that interaction and *interactivity* (i.e., the process by which interaction is achieved) are "both widely used terms, but largely undefined concepts" (p. 2). Citing Hawkins (1988), Lane (2001) writes: "As a way of thinking about communication, it [interactivity] has high face validity, but only narrowly based explication, little consensus on meaning, and only recently emerging empirical verification of actual role" (p. 2).

Interaction in Distance Education and Training – Moore's Framework

Saba (2000) identifies the concept of interaction as a common theme in distance education research. Building interaction into the instructional design of distance education and training is often cited as critical to student learning. Hillman et al. (1994) cite Holmberg (1988), Shale and Garrison (1990), Moore (1989) and others who maintain that interaction among instructor, student, and subject content is fundamental in education (p. 30). However, Saba (2000) points out that these studies are mostly paradigmatic in that "their discussion of interaction transcends the idea of distance in its physical sense and embraces the discussion of teaching and learning in general" (p. 4). Saba maintains that the physical separation of instructor and learner in technology-mediated education is secondary to the consideration of factors affecting the quality of their interaction (p. 4). If Lane's (2001, p. 2) argument that interaction is a largely undefined concept in the general practice of education is correct, then this would suggest that our lack of understanding is exacerbated when education is conducted at a distance.

Nevertheless, the importance placed on interaction in distance education and training is evident in matrices that aid practitioners in the selection of instructional technologies. For example, Norenberg and Lundbald (1987, in Kerka, 1989) suggest that the choice of medium should be based on such factors as program objectives, cost, learner characteristics and the *level of interactivity* that the medium will support. Hillman et al. (1994) state that facilitating interaction in distance education necessitates some form of mediated communication. This medium, they argue, "must be evaluated not only as an information delivery system but also as a medium through which interaction must pass" (p. 32).

Moore (1989) states that many of the greatest problems of communicating about concepts and practices in distance education arise from "crude hypothetical constructs" of terms, like "interaction" and "interactivity." He maintains that such terms are used in imprecise and general ways so as to denote a multiplicity of meanings. Moore suggests that misunderstandings between educators who use different media can be overcome by adopting common conceptual frameworks (p. 1). In what is now considered a seminal contribution to the field of distance education, Moore proposes a conceptual framework for understanding interaction by identifying three distinct, but *closely related* types of interaction: learner-content interaction, learner-instructor interaction, and learner-learner interaction. This conceptual framework (described below) is widely cited in distance education literature as a useful construct for understanding interaction regardless of the instructional medium.

Learner-Content Interaction

Moore (1989) defines learner-content interaction as "interaction between the learner and the subject content" (p. 2). He describes this type of interaction as:

> ...a defining characteristic of education. Without it there cannot be education, since it is the process of intellectually interacting with content that results in

> changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind. It is this type of interaction that I believe is at least partly involved in what Holmberg (1986) calls the 'internal didactic conversation' when learners 'talk to themselves' about the information and ideas they encounter in text, television program, lecture or elsewhere (p. 2).

Moore states that the oldest form of distance teaching are medieval didactic texts which facilitated learner-content interaction by aiming to instruct and not merely inform (p. 2). Later, learner-content interaction was advanced with the invention of home study guides that provided explanations of text and directions for its study. Today, this type of interaction is not limited to printed text. It is now possible for learners to engage in didactic interaction with content through radio and television broadcasts, electronic recordings on videotapes and audiotapes, and computer software programs (p. 2).

Learner-Instructor Interaction

The second type of interaction occurs between the "learner and the expert who prepared the subject material, or some other expert acting as instructor" (Moore, 1998, p. 2). According to Moore, this type of interaction is regarded as "essential by many educators and as highly desirable by many learners" (p. 2). In learner-instructor interaction the instructor:

- Seeks to motivate learners to learn by stimulating and maintaining the students' interest;
- Makes presentations that may involve disseminating information, demonstrating skills and/or modelling certain attitudes and values;
- Organizes students' application of newly learned information and/or skills;
- Evaluates to ascertain if learners are making progress and learning strategies are producing desired results; and,

- Provides counsel, support and encouragement to each learner, although the extent and nature of this support varies according to the educational level of learners, the instructor's personality, philosophy and other factors (Moore, 1989, p. 2).

Moore distinguishes between learner-instructor and learner-content interaction based on the "frequency and intensity of the teacher's influence on learners." According to Moore, the instructor's influence is greater when there is learner-instructor interaction than when there is only learner-content interaction. Moore (1989) writes:

> Where interaction between learner and teacher is possible through correspondence or teleconference, the learner comes under the influence of a professional instructor and is able to draw on the experience of the professional to interact with the content in the manner that is most effective for that particular individual learner (p. 3).

Learning programs which are characterized by one-way communications with a subject expert are considered to be solely content-interactive in nature, even though the educator can design instruction to make presentations, motivate learners, facilitate application, evaluate and even provide a degree of learner affective support. It is the lack of feedback from the learner to the instructor which leads Moore (1989) to categorize this form of instruction as "highly generalized, not individual" and "leaving ultimate responsibility for maintaining motivation, for interacting with the presentation, for analysing the success of application and for diagnosing the difficulty on the learners themselves" (p. 3).

Learner-Learner Interaction

Moore (1989) defines learner-learner interaction as "inter-learner interaction between one learner and other learners, alone or in group settings, with or without the real-time presence of an instructor" (p. 4). Moore feels that this third type of interaction poses the greatest challenge to our current thinking and practice in distance education (p. 3). According

to Moore, "learner-learner interaction among members of a class or other group is sometimes an extremely valuable resource for learning and is sometimes even essential" (p. 3). Moore addresses the qualifier of "sometimes" by providing these examples of when learner-learner interaction is deemed valuable:

> With the rationale that skilled committee and other group work is essential for functioning in modern society, especially in business, Phillips et al. taught principles of, and trained students in, effective group functioning. This is an example of content that makes group interaction especially valuable. One could study the presentation of principles of group leadership and group membership alone, or in interaction with an instructor. However, at the point of application and evaluation, the availability of a group of fellow learners becomes invaluable (p. 4).

Apart from teaching interaction itself, Moore (1989) suggests that the desirability of learner-learner interaction depends largely on the age, experience and level of autonomy of learners. Peer-group interaction is a more important source of stimulation and motivation for younger learners, but is "not particularly important for most adult and advanced learners who tend to be self-motivated" (p. 5). Thach (1995) also adds that techniques to build interaction into instruction appear to be different depending on the subject matter, educational philosophy of the institution or faculty, and the type of learner (p. 98). However, neither author offers more definitive guidelines based on these observations.

Moore (1989) makes highly generalized statements indicating that educators need to organize programs to ensure maximum effectiveness of each type of interaction, and to ensure that the type of interaction provided is suitable to both the instructional objectives and to learners' stage of development (p. 5). The main weakness that Moore finds with many distance education programs is their commitment to only one type of medium. "When there is only one medium," writes Moore, "it is probable that only one kind of interaction is permitted or done well" (p. 5).

Learner-Interface Interaction

Most discussions of interaction in distance education stem from Moore's framework of the three types of interaction: learner-content, learner-instructor and learner-learner. However, Hillman et al. (1994) observe that these previous discussions fail to consider the interaction that occurs between the learner and the technologies used to deliver instruction (p. 19). Referring specifically to Moore's model, Hillman et al. (1994) write:

> Although each of these three types of interaction addresses the use of technologies as bridges for interaction, they fail to take into account the interaction that occurs when a learner must use these intervening technologies to communicate with the content, negotiate meaning, and validate knowledge with the instructor and other learners (p. 30).

According to Hillman et al. (1994) what is missing from previous discussions of interaction is an equal treatment of a fourth type of interaction: learner-interface. Citing Salomon (1974), Hillman et al. maintain that the medium used to transmit information dictates the means of interaction that is peculiar to the medium and "colours the content" (p. 32). They observe that different media require different mental skills of the learner and suggest that a facet of distance education that is increasingly overlooked is the effect of "high-technology devices" on interaction. The greater use of these devices, as well as their increasing complexity has led Hillman et al. to define a model of learner-interface interaction.

The learner-interface model identified by Hillman et al. (1994) suggests that the learner must be "literate in the medium's rules of interaction" in order to extract the intended message during the educational transaction (p. 32). In other words, learners need to possess the necessary skills to effectively manipulate the various mechanisms of the delivery technology before they can successfully interact with the content, the instructor and other

learners (p. 32). Hillman et al. state that learner-interface interaction is a process of manipulating tools to accomplish a task. As a process, it requires the learner to "operate from a paradigm that includes understanding not only the procedures of working with the interface, but also the reasons why these procedures obtain results" (p. 34). They also emphasize that successful learner-interface interaction is highly dependent upon how *comfortable* [italics added] the learner feels in working with the delivery technology (p. 32).

Hillman et al. (1994) challenge distance education practitioners to create new instructional methods that empower learners to work successfully with the delivery technology. However, they recognize that in learning systems such as satellite networks, comprised of multiple sites that do not have the assistance of on-site coordinators, orienting students to the technology can be difficult (p. 39). The complexity of meeting this challenge is compounded by the fact that "in distance education, the interface itself is unlikely to be relevant to the subject being studied. Instead, it merely acts as a confounding intermediary between the three modes of interaction" identified by Moore (Hillman et al., 1994,p. 34). Ideally, suggest Hillman et al., the interface interaction should aid communication without attracting attention and energy to itself. Schreiber (1998b, p. 52) also reports that learner-interface interaction is improved when there is limited distraction from "side-effects of technology" or from hardware or software demands.

Undoubtedly, Moore (1989) and Hillman et al. (1994) propose a valuable schema for conceptualizing interaction in distance education, but at best it provides distance education practitioners with only a general descriptive framework, not a theory to guide practice. A theory, according to Glaser and Strauss (1967), goes beyond description of a phenomenon to *predict* and *explain* behaviour; it is usable in practical applications, giving practitioners

understanding and some control of situations (p. 3).

There is still much work to be done before the practice of distance education and training can be said to be guided by a "theory of interaction." Many questions remain to be answered before we can begin to define such a theory. Some of these questions, framed within the context of satellite training, are considered in this study:

- What are the defining features that constitute a paradigm of real-time interaction in one-way video, two-way audio satellite training?
- What instructional strategies and techniques define the four types of interaction in satellite-based training?
- What, if anything, does real-time interaction contribute to the satellite learning experience?
- Are different types of corporate satellite-based training applications characterized by different interaction profiles?

Learner Satisfaction and Motivation

One assumption, central to this study, is the notion that interaction in distance training affects learners' satisfaction in the learning experience. There is ample evidence in the literature to suggest this is the case. Fulford and Zhang (1993) cite numerous studies reporting that learners who experience higher levels of interaction have both more positive attitudes towards the learning experience (Ritchie & Newby, 1989; Garrison, 1990; Hackman & Walker, 1990) and higher levels of achievement than those experiencing less interaction (McCroskey & Andersen, 1976). They explain these findings by suggesting that learners who are not actively engaged during the instruction tend to become distracted and less motivated.

Fulford and Zhang suggest that the need for interaction can be explained by a theory of

cognitive speed (Fulford 1993, in Fulford & Zhang, 1993). According to this theory, an instructor speaks at approximately 125 to 150 words per minute, internally monitoring what they say. Learners, as they listen, have the cognitive capacity to process speech at twice that rate. If only half of their capacity is needed to listen to the instructor, the other half may be used to engage in internal conversation. Interested learners may stimulate their own involvement through this semantic cognitive capacity. However other, less motivated learners may engage in distracting thought patterns that veer away from the instructional subject matter. If these learners are not engaged in instruction through interactivity, their renegade thought patterns may dominate their cognitive activity, impeding the learning (p. 9).

Fulford and Zhang (1993) liken maintaining "anticipated" interaction to "throwing a ball around: all participants must be alert since no one is sure to whom involvement will come next. Overall classroom interactivity may keep all learners alert and involved whether they are personally contributing or not" (p. 10). Understanding this process is especially important in the distance education context where the engagement value of the instructor's physical presence is diminished by distance. The opportunity to engage each learner in overt interaction is limited, and subtle yet powerful interactions through body language are lost (p. 8). The key to this understanding may lie in what Kruth and Murphy (1990, in Fulford & Zhang 1993, p. 10) describe as "vicarious interaction"; that is, learners participate *cognitively* by silently responding to questions. Fulford and Zhang hypothesize that if learner perceptions of interaction remain high through vicarious and/or anticipated interaction, these perceptions may promote positive feelings toward the instruction. However, they caution that in distance education, learner perceptions of the amount of *overall interaction* during instruction may be

altered, and that higher levels of interaction may be needed to motivate and satisfy learners (p. 8).

Fulford and Zhang (1993) have studied learner perceptions of interaction in instruction and concluded that *perception* of the level of interaction is a critical predictor of learner satisfaction (p. 17). They differentiate between actual learner participation and vicarious interaction, which does not overtly engage each individual learner. Fulford and Zhang write, "overall interaction dynamics may have a stronger impact on learners' satisfaction than strictly personal participation. Vicarious interaction may result in greater learner satisfaction than would the divided attention necessary to ensure the overt engagement of each participant" (p. 10). The ramification of this conclusion, states Saba (2000), is that educators must devise strategies to increase and improve learner perception of *overall* interaction (p. 3). This recommendation is particularly important for corporate satellite training where the sheer size of the learner audience participating in instructional broadcasts makes the overt engagement of each participant unfeasible.

Graham and Wedman (1989) relate learner satisfaction to learner motivation. They observe that during satellite training:

> low motivation tends to spread like a virus, first from individual to individual and then from site to site. The signs of low motivation are familiar: participants fail to respond to questions; they return from breaks well after the agreed upon time; they leave before the training session is over, sometimes without the instructor being aware of the defection (p. 185).

Graham and Wedman caution that failure to address the motivational aspects of satellite training makes the learning experience less appealing. Keller (1983, in Graham & Wedman, 1989, p. 186) identifies four instructional factors which contribute to the motivational aspects of instruction. These factors are:

1. **Attention** – learners must attend to the important content topics;
2. **Relevance** – learners must see the relationship between the content and their job responsibilities or personal situations;
3. **Confidence** – learners must believe they can learn and successfully apply the content; and
4. **Satisfaction** – learners must see that the learning outcomes are consistent with their expectations.

Keller (1983, in Graham & Wedman, 1989) claims that training which incorporates these four motivational factors is more likely to be successful because learners will devote more effort to learning the subject content. On the other hand, "more than a question of enjoying a particular course, failure to address these motivational factors may turn some learners away form future training of a similar nature" (Graham & Wedman, 1989, p. 186).

In considering factors that may impact learner motivation and satisfaction, Graham and Wedman (1989) suggest that it is helpful to think of satellite training as an "innovation" in which factors determining learner acceptance of this technology play an important part (p. 186). Rogers' (1983, in Graham & Wedman, 1989, pp. 186-187) model pertaining to technological innovations indicates that an innovation will be adopted more quickly if potential adopters (e.g., learners) perceive the innovation to possess the following attributes:

- **Relative advantage** – the degree to which an innovation is perceived as being better than the status quo;
- **Simplicity** – the degree to which an innovation is perceived as being relatively easy to use and understand;

- **Trialability**– the degree to which an innovation may be experimented with on a limited basis;
- **Compatibility** – the degree to which an innovation is perceived as consistent with prevailing values, practices, experiences and needs; and
- **Observability** – the degree to which the results of an innovation are visible to others.

Graham and Wedman (1989) conclude that to become an accepted training delivery mode, learners need to perceive satellite training as possessing most if not all of the five attributes described above. But neither Graham and Wedman, nor Rogers' innovation adoption model, attempt to explain the *relative* importance of these innovation attributes. Are these attributes all equally important, or do some carry more weight in influencing learner acceptance and therefore learner satisfaction in satellite-based training? Reporting on learner perceptions in satellite training, Graham and Wedman (1989) found that instructional broadcasts are viewed:

> somewhat sceptically and as less appealing, especially when adult learners are involved. Why do some participants leave a teletraining experience reluctant to attend a future one while others leave excited about their experiences and willing to enrol in other teletraining courses? Was it the quality of the instructional design, the motivational climate, or the teletraining technology itself that made the difference? (p. 183).

Answers to the above questions, posed by Graham and Wedman, are most certainly relevant to distance training practitioners who hope to offer a high quality distance learning experience. However, Graham and Wedman (1989) state that too often program developers concentrate on only one of the above aspects of the learner's experience. In light of the complex nature of satellite distance training, they argue that all three – instructional design, the motivational climate and the satellite technology itself – must be viewed in concert in order to enhance learner satisfaction (p. 183). The key to enhancing the appeal of satellite

training, according to Graham and Wedman, is to examine the experience from the perspective of the learner. This is precisely the approach this study purports to take.

Media and Learning

A medium is a channel of communication that is defined by its technology, symbol systems and information processing capabilities (Kozma, 1991, p. 180). A medium typically refers to any technology that facilitates communication by carrying information between a source and a receiver. When the messages have an instructional purpose, the mediating technology is described as an "instructional medium" (Heinich et al., 1996, p. 8).

Some authors hold the view that while distance education relies on technology for the communication of content, the influence and effectiveness of that communication is unaffected by the medium (p. 33). For example, following a review of literature, Clark concludes that " media do not influence learning under any conditions" (Clark 1983, in Kozma, 1991, p. 179). The implication of this is that "there is no learning benefit to be gained from employing any specific medium to deliver instructions" (Clark, 1983, in Duby, 1991, p. 190). This view is based on comparative studies that find no significant differences in learning results achieved through different media. With respect to instructional broadcasts, Schramm (1962, in Saba, 2000) summarized the results of more than 400 "scientifically designed and statistically treated comparisons" of instructional television and classroom instruction. He concludes that, "we can say confidently that students learn from it, and that they learn fast and efficiently...the conclusion has been 'no significant difference' between learning from television, and from classroom teaching" (p. 2). Winn (1984, in Hillman et al.) concurs with such findings, stating that "the way information is delivered has very little effect on the way it is understood. We can only facilitate understanding by good planning and

sound instruction" (p. 33). Willis (1992) echoes this view when he writes: "effective teaching at a distance is more the result of preparation than innovation" (p. 1)

Koumi (1994), on the other hand, is sceptical of comparative studies that find no significant differences between instructional media. He suggests that "research on comparative efficacy of media has been flawed, giving a false impression of the equipotentiality of media" (p. 41). When comparing the potential of different media, Koumi argues that, to be fair to each medium, we would need to employ highly creative practitioners and provide them with the necessary resources to fully exploit the capabilities of each medium's symbol systems (p. 41). Koumi observes that in media comparison studies, researchers have invariably ignored the fact that there is rarely any control of production quality between media being compared. Likewise, most of these experiments take no account of the professional competence of the production teams.

Other factors that may obscure differences in outcome for different media include learners' attitudes towards the medium. Koumi (1994) argues that learners may simply not take some forms of distance learning as seriously as others (p. 44). For example, Graham and Wedman (1989) report that instructional broadcasts in particular are viewed somewhat sceptically and regarded as less appealing by adult learners (p. 183). Koumi (1994) also suggests that differences in learning styles present yet another confounding variable in comparative studies (p. 44).

Saba (2000) identifies the methodology used in comparative studies as a serious limitation. He writes that comparative studies:

> were grounded in the physical science paradigm and its related experimental method. They require reduction of experimental concepts to their simplest form, and elimination of environmental elements to establish a direct cause

> and effect relationship between the experimental stimulus and the response emitted by the subjects in mass (p. 5).

Despite concerns about the validity of comparative studies, there is some evidence in the literature to support the argument that instructional technology in general, and learner-interface interaction in particular, *does* affect learning. For example, comparative studies conducted by IBM show that learners' test results from instructional broadcasts were slightly *higher* than those achieved in classroom versions of the training (Fry, 1993, p 10). Disputing the notion of media "equipotentiality," Koumi (1994) argues that each medium has its distinctive attributes, symbol systems, strengths and weaknesses (i.e., medium usability characteristics) and that there are significant pedagogic reasons for choosing one medium over another (p. 41). Salomon (1976, in Duby, 1991) was the first to demonstrate a connection between a medium's usability characteristics and the user's mental skill development. Adams and Hamm (1988, in Hillman et al., 1994) found that transmitted content affects the knowledge acquired, and that the medium's communication technology affects the modes of interaction, particularly when users are unfamiliar with the communication technology (p. 33). These findings are supported by Gilcher and Johnston (1988, in Hillman et al., 1994) who report that learners who were inadequately trained in the use of an audiographics system were unable to participate in the interactive activities planned by course designers (p. 33). Hillman et al. (1994) hypothesize that learners who are unskilled in interacting with the communication medium must dedicate the majority of their mental resources to using the technology to *retrieve* the instructional information, thus leaving fewer resources for *learning* the instructional content (p. 35). The authors also make the point that new users are often fearful and that this fear may be attributed to many dimensions of learner-interface interaction – from fear of "hurting the machine" to "fear of seeming stupid

in comparison to other users" (p. 33). Whatever the cause, it is reasonable to surmise that fear might be an inhibiting barrier to the learning process.

In response to the question "do media influence learning?" Kozma (1991) writes:

> [Research] suggests that capabilities of a particular medium, in conjunction with methods that take advantage of these capabilities, interact with and influence the ways learners represent and process information and may result in more or different learning when one medium is compared to another for certain learners and tasks (p. 179).

Kozma (1991) proposes a theoretical framework in which learning is viewed as an active, constructive process whereby the learner, actively collaborating with the medium, "strategically manages the available cognitive resources to create new knowledge by extracting information from the environment and integrating it with information already stored in memory" (p. 179). The importance of Hillman et al.'s (1994) learn-interface interaction paradigm is therefore central to Kozma's theoretical framework.

Garrison (1990, in Hillman et al., 1994) states that "the effectiveness of the educational transaction is dependent upon the facilitation of communication and the active involvement of the learner" (p. 34). However, Hillman et al. (1994) emphasize that regardless of the learner's proficiency level, inability to interact successfully with the technology, whatever the cause (e.g., technology failure), will inhibit the learner's active involvement in the educational transaction (Hillman et al., 1994, p. 34). This point has significant implications for satellite-mediated instruction, which is particularly vulnerable to transmission failures due to human error as well as frequent atmospheric disturbances, such as solar flares.

Live, interactive videoconferencing as described in this study allows for two-way audio and one-way video communication. Studies in education claim that we learn 20% of what we see, 40% of what we see and hear, and 70% of what we see, hear and do (Meister, 1998, p.

52). If this is true, then combining the capabilities of satellite-based delivery with good instructional design principles should produce a formidable learning experience. However, Schreiber (1998b) cautions that the effectiveness of satellite to deliver distance training to *both* visual and audio learners depends on how well the instructional materials are designed to utilize the technology's unique capabilities (p. 57).

The distance education literature acknowledges television's potential as a rich learning medium; recognizing the medium's capability to simultaneously carry dense information through many varied presentation characteristics (Haughey 1985; Duby, 1991; Koumi, 1994; Keegan, 1995; Heinich et al. 1996; Lawry 1985). However, Frost (2000) makes the compelling argument that:

> if technology is to be effective in assisting education in its efforts to teach effectively, it must not be used simply to create more information. Our goal should be to create ever greater quality, not just more of the same material dressed up in new technogarments (p. 4).

Studies supporting the view that the learning is affected more by what is delivered than by the delivery medium suggest that instructional strategies play a vital role in overcoming any limitations or subverting any advantages that may be inherent in an instructional technology. In other words, instructional strategies and *not* the medium are key to effective learning (Salomon 1981; Clark 1991, in Jeffries, 2001, p. 3). Koumi (1994) reconciles his view of media usability characteristics with a recognition of the paramount importance of defining sound instructional strategies when he writes:

> Instead of persisting in trying to "prove" media, let's first try to deploy different media to best effect. Let's take that as sensible and get on with the job of being as creative as possible with the distinctive capabilities of each medium.... Admittedly the criteria for optimal media deployment have been mainly in the form of unwritten intuitions (p. 44).

Thach (1995) agrees that effective instructional design is a core component of successful distance learning but observes that "too often more emphasis is placed on mastering the technology rather than determining which instructional methods and presentation styles are most effective" (p. 94). Thach adds that with advances in technology such as satellite-based delivery, this situation is only exacerbated as the new "tool" is viewed as the most exciting component of instruction, instead of just a means to facilitate learning. This criticism appears to be particularly targeted at satellite-based training, where exacting technical "TV production" considerations, rather than the instructional development process, tend to be the driving force behind distance training initiatives (Thach, 1995).

Interaction in One-way Video, Two-way Audio Satellite Training

Instructional events for adult distance learners are strengthened by increased levels of learner-instructor and learner-learner interaction (Schreiber 1998b, p. 51). Educators at the University of Wisconsin claim to have validated the importance of interaction as it relates to videoconferencing design and delivery and conclude that "the importance of interaction when using videoconferencing cannot be overemphasized" (Lehman & Dewey, 1998, p. 228). Thurman (1995) also agrees that "regular interactivity not only benefits students, it also gives instructors a feeling of personal involvement with students, helping them to make the transition to distance teaching" (p. 9).

Siantz and Pugh (2001) state that the availability of interactive video and audio features leads to the assumption that training which utilizes these technologies will automatically be highly interactive. However, while newer technologies like satellite may allow interaction, they do not *ensure* it (Siantz & Pugh, 2001, p. 1). Moore (1989) found that teleconferencing is "excellent for learner-learner interaction and, for some types of instructor-learner

interaction, but is frequently misused for instructor presentations that could be done better by print or recorded media" (p. 4). Moore's concern is underscored by statistics such as those reported by Wayne State University which show that instructors are able to cover 20% to 30% *more* material during teleconferences than they could, given the same amount of time in a traditional classroom setting (Thurman, 1995, p. 9). One can only wonder to what extent these gains in "instructional output" are achieved at the expense of overall interactivity. Moore suggests that in the time saved by avoiding such [instructor] presentations, a teleconference could stimulate and "facilitate learner-learner interaction that has been difficult or impossible to achieve in distance education until now" (Moore, 1989, p. 5).

Although the research indicates that satellite training can be as effective as other instructional delivery modes, Graham and Wedman (1989) report that some adult learners express doubt about its overall effectiveness. For example, with respect to learner-content interaction, some learners believe that satellite training is appropriate for reviews or updates, but not for presenting new content (p. 184). Graham and Wedman assume that learner comments such as "good media for certain kinds of information," and "the mismatch between content and medium make the program awkward," illustrate these doubts (p. 184).

Affording the opportunity for learner-instructor and learner-learner interaction in real time is considered to be one of the major advantages of satellite-based distance training – but one that significantly increases both the cost and the complexity of the training's design and delivery. This situation has prompted some to question the importance and value of live interaction in satellite-based training. The question is often raised concerning the quality and even the worth of interaction that is possible via one-way video, two-way audio satellite training, especially when there are many distant sites receiving the instructional broadcast

(Lawry, 1985, p. 13). Lawry (1986) defines the problem in these terms:

> While it is documented that instruction delivered in this way can be quite effective, it is nonetheless instruction which must contend with a very real constraint on its effectiveness – namely, its inability to communicate a simultaneous live video picture in conjunction with the audio transmission (p. 2).

Willis (1992) observes that in face-to-face teaching situations, instructors rely on a number of visuals and unobtrusive cues from their students to enhance their delivery of instructional content and the quality of learner-instructor interaction. In contrast, an instructor using the medium of one-way video, two-way audio satellite receives no visual information from the distant sites. Given this limitation, Willis observes that, the instructor "never really knows, for example, if students are asleep, talking among themselves, or even in the room" (p. 1). Willis also adds that it is difficult to carry on stimulating learner-instructor discussion when technical requirements and protocols hamper spontaneity. For example, instructors report that they find the lack of human feedback and the need to speak into "a cold, unresponsive camera" is a difficult adjustment from the classroom experience (Thach, 1995, p. 102).

Ellis (1992) reports that instructional designers utilizing the videoconferencing medium typically borrow techniques from traditional broadcasting. Commenting on this practice, Acker and McCain, (1990, in Ellis, 1992, p. 3) state that "electronic meetings are handicapped if approached from a broadcasting perspective." Ellis maintains that the usual practice of transmitting a message unidirectionally to an indeterminate audience disregards interaction required by many students. Furthermore, Ellis writes, "certain broadcasting production standards may not be necessary with an environment that requires a different media aesthetic (Zettl, 1990, in Ellis, 1992, p. 3), and education may be an area where such a

different aesthetic may apply" (Acker & Levitt, 1987, in Ellis, 1992).

Piskurich (1997) concludes that many satellite courses are in fact "live canned presentations" using a format that was once called a "talking head." His recommendation is, "if you want interaction you have to design it" (p. 21). Piskurich is particularly critical of interaction that is limited to learner-instructor communication and adds that the usual practice of asking a satellite learner audience if there are any questions "is not interaction. It's not even useful for gathering feedback" (p. 21). Piskurich (1997) argues that, from a learning perspective, there is no difference between a trainee watching a video program live or on pre-recorded videotape, if no direct interaction is going to occur. Lawry suggests that the advantages live broadcast offers over the relatively less complex and less expensive alternative of pre-recorded videotape are dependent on the type of format used for the production of the satellite training (Lawry, 1985, p. 13).

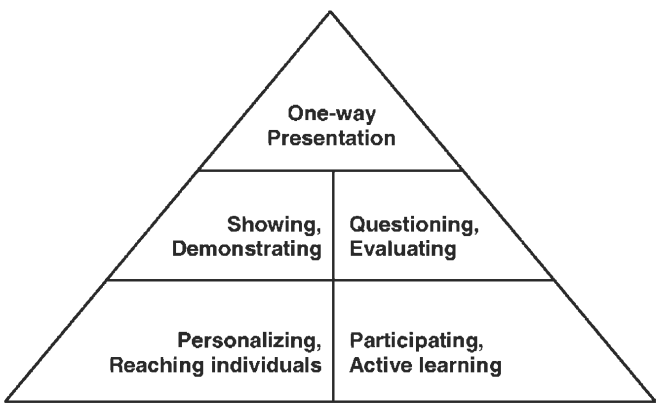
Some scholars suggest that borrowing from the tradition of face-to-face teaching allows distance education practitioners to draw on a variety of interactive activities (Lehman & Dewey, 1998). Many of these activities, with a little creativity, may be adapted to satellite distance training. Table 1 shows an Interactivity Spectrum (Monson 1995, in Lehman & Dewey 1998, p. 228) that groups interactive activities into five categories, sorting them from "very simple"(e.g., top of each list) to much "more complex" (e.g., bottom of each list).

Table 1. Interactivity Spectrum

Present	Personalize	Show	Participate	Question
Lecture	Name use	Objects	Readings	Question & Answer
Expert guest(s)	Postcards	Pictures	Fax/e-mail	Black box
Interviews	Bio-form	Trigger video	Group work	Debates
Case study	Bio-booklet	Participant video	Field trips	Quizzes
Storytelling	Dialogue	Simulation	Lab sessions	Fish bowl

The Interactivity Guide Pyramid (Monson 1995, in Lehman & Dewey 1998, p. 229) shown in Figure 1 proposes a balanced mix of activities that may be integrated into the satellite training's instructional design to create a well-balanced program. Lehman and Dewey (1998) advise instructional designers to keep in mind the total context of the program as they select activities from the Interactivity Spectrum. They caution that instructional designers should choose sparingly from the "Present" group of activities, but that these activities may be used more generously if counter-balanced with activities from the other groups (p. 228).

Figure 1. Interactivity Guide Pyramid



Lawry's (1985) findings suggest that "electronic connectedness" is a different kind of interaction than what takes place in the traditional classroom and that some learners are not comfortable with this type of interaction. Fulford and Zhang (1993) report that learners found it easier to interact when encouraged to do so by the instructor's queries. However, as Thach (1995) observes, the time constraint of the satellite medium, which relates directly to the cost of satellite time, studio rental, and technician support, often sidelines issues related to interaction (p. 107). This view is evident in the following quote made by one instructor who questions the need for interaction in satellite-based training:

> I don't believe in using small group discussion on TV because it costs too much. If you are paying for satellite time, why waste it with boring discussion? You need to continue action and excitement. Let them have their discussion and ask questions at the end of the program, after it has gone off the air – not during the program (Thach, 1995, p. 100).

The dilemma in satellite training identified by Fulford and Zhang (1993) is that it "is often too time-consuming to provide occasion for every student to join the discussion... therefore, in practice, general discussion only includes a small number of students" (p. 16). What happens when satellite training is offered to large learner populations and it is impossible for everyone to interact? Will only some learners be cognitively engaged, and thus have positive attitudes and learning outcomes? Or, is it possible that higher levels of *overall* interaction, rather than *individual* interaction, can generate a positive effect for all learners? These questions, posed by Fulford and Zhang, are particularly relevant to the practice of corporate distance training by satellite, which is typically delivered to larger learner audiences.

Stone (1988) questions the value of synchronous interaction on the basis of a fundamental principle in distance learning – that distance learners perform better when *they*

control where and when learning occurs (p. 16). He suggests that for some types of learners, the flexibility of non-interactive delivery formats (i.e., videotape) is useful, effective and preferred. Stone writes:

> None of this is to suggest that faculty and students do not need to interact. However, data indicate that as long as levels of student-faculty interaction are at a tier both necessary and sufficient to support quality instruction, even though not carried out in real-time, non-interactive delivery formats are both useful and effective in balancing competing work and school demands (p. 16).

By weighing synchronous interaction against the principles of learner control, Stone is basing his argument on the philosophical underpinnings of distance learning. His conclusion is that the benefits of synchronous electronic teaching at a distance must be critically examined before they can justify the abandonment of Wedemeyer's (1971, in Keegan, 1996, p. 109) notion that "a distance education course should be available any time, anywhere there are students or only one student."

Instructional Systems Development

Schreiber (1998b) states that distance training represents a process composed of multiple and diverse components. She associates these components with several categories, including the learner, the instructor, the learning environment, the instructional delivery technology and the culture of the organization providing the training (p. 39). Schreiber (1998b), Haughey (1985) and others advocate the use of the Instructional Systems Development (ISD) approach because it provides a strategy for accounting for all of the components of an instructional process, as well as explaining the role each component plays within a given instructional event. This study seeks to apply the principles of Instructional Systems Development by considering:

- What are learners' perceptions of each type of interaction and how do these relate to learner satisfaction in satellite training?
- What advantages and limitations does one-way video, two-way audio satellite training present for designing interactivity?
- What variables influence learners' motivation to interact in satellite-based training?
- What are the theoretical frameworks that might guide distance training professionals in designing interactivity for satellite?

Summary

This chapter has provided a review of literature regarding satellite technology in distance education, with a particular focus on how this instructional technology has been applied to the practice of corporate distance training. The need for corporate distance training was examined in general and as it pertains to one case of practice, a major Canadian bank, which provides the organizational context for this study.

The introduction of advanced telecommunications technology, such as satellite, is changing our understanding of distance education. This has prompted some to call for a broader definition of distance education, based primarily on the new modes of interaction such technologies make possible. Although there is a general consensus that the concept of interaction is poorly defined and poorly understood, the importance of interaction to the learning process is generally acknowledged and many examples of possible benefits are cited in the literature. The most useful framework is offered by Moore (1989) and expanded upon by Hillman et al. (1994). The literature suggesting possible relationships between interaction and learner satisfaction, as well as media and learning, were also reviewed. And finally, the

literature was used to identify possible challenges faced by distance educators in incorporating interaction in one-way video, two-way audio distance learning systems.

CHAPTER III

METHODOLOGY

"It is a capital mistake to theorize before one has data."
Sherlock Holmes

Introduction

This exploratory study examined the empirical data pertaining to the importance of interaction to learner satisfaction in satellite-based corporate training. The purpose of this research was to generate a theoretical framework that might guide distance training practitioners in designing interaction in satellite programs.

The study untilized multiple methods of qualitative and quantitative data collection. It examined historical records of five satellite training sessions and learners' reaction evaluations related to these sessions. It queried interview participants on their experiences as satellite learners and solicited their suggestions on how this learning experience might be improved. The research attempted to uncover, through analysis of historical records and transcripts of interviews with satellite learners, possible variables impacting both the frequency and quality of learners' interaction during satellite training. It also sought to understand the relationship between these variables and overall levels of learner satisfaction in satellite training.

This research was undertaken using the grounded theory method of qualitative inquiry introduced by Glaser and Strauss (1967). Grounded theory methodology is "constructed as a problem-oriented endeavour in which theories are abductively generated from robust data patterns, elaborated through the construction of plausible models, and justified in terms of their explanatory coherence" (Haig, 1995, p. 1).

The research design used in this study was of major importance in obtaining data that are grounded largely in the personal experiences of learners at the Bank, in the documentary evidence of historical records, and to some extent, in my direct observation as the researcher. The case study method, as an emergent research methodology, was considered appropriate for providing a holistic approach to the study of interaction in satellite-based corporate training. A case study is defined as an "empirical inquiry that investigates a contemporary phenomenon within its real life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (Yin, 1984, in Lawry, 1986). The case of practice examined in this study was a major Canadian bank's satellite learning network. The phenomenon under study was learners' perceptions of interaction in one-way video, two-way audio satellite-based corporate distance training.

Grounded Theory Analysis

Grounded theory (also called the "constant comparative method") is a qualitative methodology, which derives its name from the practice of generating theory from research that is "grounded" in empirical data. The key premise of this approach is that theory is derived from data and then illustrated by characteristic examples of data (Glaser & Strauss, 1967). As such, grounded theory represents a departure from the deductive, experimental methods of scientific inquiry in that theory is not generated *a priori* and subsequently tested, but rather, it is:

> inductively derived from the study of the phenomenon it represents. That is, discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon. Therefore, data collection, analysis and theory should stand in reciprocal relationship with each other. One does not begin with a theory, then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge (Strauss & Corbin, 1990, p. 23).

There are three elements of a theory that are generated by comparative analysis: 1) conceptual categories; 2) their conceptual properties; and 3) hypotheses or generalized relationships among the categories and their properties. According to Glaser and Strauss (1967) "a category stands by itself as a conceptual element of the theory. A property, in turn, is a conceptual aspect or element of a category" (p. 36). It is important to note that categories are higher in level and more abstract than the concepts they represent. They are generated through an analytic process of making comparisons to highlight similarities and differences between lower level concepts. Strauss and Corbin (1990) stress that categories are the "cornerstones" of developing theory because they provide the means by which the theory can be integrated (p. 7). Hypotheses, the third element of grounded theory, indicate generalized conceptual relationships between a category and its concepts and between discrete categories.

Ground theory was selected for this study for the reasons noted by Babchuk (1996):

> This methodology, however, appears to hold considerable potential for the study of adult education problems and issues. Given its focus on generation of theory from data collected in the field, it seems ideally suited for adult education, a discipline which is characterized by its lack of a well-developed theoretical foundation and a strong commitment to the world of practice (p. 5).

Grounded Theory Refined

In later years, Glaser and Strauss, writing alone or with others, began to reflect and expand on their theory. Whereas many of the central components of grounded theory were outlined in their earlier writings, it became clear that there were important differences in how each of these scholars later envisioned grounded theory and its use (Babchuk, 1996, p. 1). The central differences between Glaser's and Strauss' versions of ground theory seem to hinge on epistemological and methodological underpinnings (Babchuk, 1996, p. 2). Glaser's approach appears to be more deeply committed to principles and practices ordinarily

associated with the qualitative paradigm. He views grounded theory as a more laissez-faire process, guided primarily by "informants" and their socially constructed realities (Babchuk, 1996, p. 2). According to Glaser, grounded theory is an inherently flexible methodology in which the researcher "should simply code and analyze categories and properties with theoretical codes which will emerge and generate their complex theory of a complex world" (Glaser, 1992, in Babchuk, 1996, p. 2). Strauss is also concerned with producing a detailed description of a cultural scene but his emphasis on "canons of good science," such as replicability, generalizability, precision, significance and verification, places his approach to grounded theory closer to the traditional quantitative doctrines (Babchuk, 1996, p. 2).

In reviewing Glaser and Strauss' versions of grounded theory, Babchuk (1996) writes that the differences between these approaches may initially seem overstated or somewhat petty. However, he argues that these differences are paramount to understanding grounded theory and may have profound effects on how adult educators conceptualize and operationalize this method of inquiry. Babchuk reports that while grounded theory is rapidly gaining momentum in the field of educational inquiry, there is considerable disagreement concerning the implementation of this approach (p. 5). What fuels ambiguity and therefore controversy, according to Babchuk, is the fact that "relatively few researchers who have conducted grounded theory analyses have outlined the specifics of their research, often failing to provide information concerning the process they employed or the methodologically-related decisions they surely must have made" (p. 5). Understandably, the absence of this information would make it difficult, if not impossible, to judge the validity, reliability, and ultimately the value of such research. To avoid similar criticism of this study, the remainder of this chapter is devoted to describing how I applied the processes of

grounded theory methodology in completing this study.

The Process of Grounded Theory Building

The generation and development of concepts, categories and hypotheses may be, as Glaser claims, an iterative and highly intuitive process. However, as a novice researcher, it quickly became apparent to me that this process would benefit from a certain amount of structure and rigor, if it was to yield anything more than some creative musings. Pandit (1996), subscribing to the Strauss and Corbin's (1990) approach to grounded theory research, identifies five analytic, but not strictly sequential phases of grounded theory building: research design; data collection; data ordering; data analysis; and literature comparison (Pandit, 1996, p. 2). According to Pandit, these phases must be evaluated against four research quality criteria:

1. **Construct validity** – construct validity is enhanced by establishing clear and specific operational procedures;
2. **Internal validity** – internal validity addresses the credibility of the study's findings and is enhanced by establishing causal relationships whereby certain conditions are shown to lead to other conditions;
3. **External validity** – external validity involves establishing clearly the domain to which the study's findings can be generalized. What is important here is analytic and not statistical generalization. This requires generalizing a particular set of findings to some broader theory and not broader population; and
4. **Reliability** – reliability involves demonstrating that the operations of the study, such as data collection procedures, can be repeated with the same results.

The following sections describe how I applied the five phases of grounded theory

methodology in order to meet the requirements of the above research quality criteria.

Phase 1. Research Design

Research design is defined as "the overall configuration of a piece of research: what kind of evidence is gathered from where, and how such evidence is interpreted in order to provide good answers to the basic research question[s]" (Easterby-Smith et al., 1990 in Pandit, 1996, p. 3). Logically, research design begins with a clear definition of the basic research questions that will delimit the scope and focus of the study, and establish its external validity.

Grounded theory does not start with hypothesis like deductive methods, but rather with a phenomenon that the researcher finds to be inadequately explained in theory, and with a well-defined research problem. The phenomenon in this case is learners' perceptions of interaction in one-way video, two-way audio satellite-based corporate distance training. The research problem being addressed is the need for a theoretical framework to guide distance education practitioners in identifying instructional strategies that maintain learner interest and involvement during satellite-based training.

Specific research questions were defined once I had delved into the area of study through a preliminary review of the literature. Strauss and Corbin (1990) describe two types of literature that might be used in grounded theory methodology: technical and non-technical. Technical literature includes professional and disciplinary writing in the form of theoretical and philosophical papers as well as reports of research studies. During the research design phase of this study, I reviewed an extensive body of technical literature to develop a theoretical sensitivity to the concepts of interaction and learner satisfaction in distance education, and corporate training in general. Non-technical literature includes letters, reports and other materials that are considered primary data to be analyzed for theory development.

Non-technical literature used in this study was comprised of three learner reaction evaluation reports complied by *Learning & Development* department since January 2000, as well as the transcripts of a learner focus group conducted in August 2001.

A review of both technical and non-technical literature resulted in the development of the following research questions:

1. What are the defining features that constitute a paradigm of real-time interaction in one-way video, two-way audio satellite training?
2. What instructional strategies and techniques define the four types of interaction in satellite-based training?
3. What, if anything, does real-time interaction contribute to the satellite learning experience?
4. What are learners' perceptions of each type of interaction and how are these related to learner satisfaction in satellite training?
5. What advantages and limitations does one-way video, two-way audio satellite training present for designing interactivity?
6. Are different types of corporate satellite-based training applications characterized by different interaction profiles?
7. What variables influence learners' motivation to interact in satellite-based training?
8. What theoretical frameworks might guide distance training professionals in designing interactivity for satellite?

Once I had gained an initial theoretical sensitivity to the area of study and identified my research questions, the next step in the process was to select the "cases" that would provide the principal units of data in this research. Two types of cases or units of data were identified:

- Historical records of satellite training programs at the Bank; and
- Bank employees who had recently participated in satellite training.

For each type of data, the sample used in this study did not obey the principles of random statistical sampling, but rather the principles of *theoretical sampling* as defined by Glaser and Strauss (1967). These authors define theoretical sampling as: "the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his data and decides what data to collect next, where to find them, in order to develop his theory as it emerges" (p. 45). This research also applied the principle of *maximum variation sampling* as defined by Patton (1990, in Correia & Wilson, 2001) by selecting different kinds of "cases" (i.e., different types of satellite training programs, and heterogeneous learner populations) in order to maximize the potential for diversity in data collected.

It is important to emphasize that in grounded theory, the sample is *emergent,* along with the theory. Strauss and Corbin state that unlike the sampling done in quantitative investigations, theoretical sampling cannot be planned before undertaking a grounded theory study. The specific sampling decision evolves during the research process itself (Strauss & Corbin, 1990, p. 192). Glaser and Strauss (1967) make the point that researchers trying to discover theory cannot state at the outset of their research how many groups they will need to sample during the entire study. They can only count up the groups at the end (p. 61). With this in mind, I began my study with some representative examples of different types of satellite training programs and an initial list of Bank employees who had recently (i.e. within the past six months) participated in satellite-based training. The samples in both types of data were selected on the basis of maximizing the diversity of information that could potentially be collected.

Historical records of satellite training programs. Videotapes of past satellite training broadcasts, and the learner reaction evaluation reports pertaining to those programs, were obtained for five satellite programs. This sample of five satellite programs represented the three different types of applications in corporate distance training, as defined earlier by Schreiber and Berge (1998): information dissemination and knowledge building; critical thinking and technical skill building; and attitude change and motivation enhancement. Details about the five satellite programs included in data collection are summarized in Table 2 and briefly described below:

- **Satellite Session #1** – this satellite session represented the first of a two-part *Advisors' Forum* program. The training was delivered to Financial Advisors and focused on "information dissemination and knowledge building" in the area of third party mutual fund investment products. The broadcast included a guest panel of well-known investment industry speakers as well as internal subject matter specialists.
- **Satellite Session #**2 – this satellite session represented the first of a three-part *Portfolio Management* training program offered to Financial Advisors. It provides an example of a "critical thinking and technical skill building" training application, which introduced new analytical processes and workflow routines for managing customer portfolios. This training supported the recent implementation of the "Financial Advisor" concept in retail branches and was an important component of post-merger integration training offered to both Pre-merger Bank and Trust Company heritage employees. The Financial Advisor concept and portfolio management process described in the training were familiar to Pre-merger Bank heritage employees but represented significant changes in job descriptions

Table 2. Satellite Programs Included in Study

Program Characteristics	Satellite Program 1	Satellite Program 2	Satellite Program 3	Satellite Program 4	Satellite Program 5
Type of application	Information dissemination and knowledge building	Critical thinking and technical skill building	Critical thinking and technical skill building	Critical thinking and technical skill building	Attitude change and motivation enhancement
Objectives	To provide investment product knowledge information to Financial Advisors (FAs)	To develop FAs cognitive skills around the application of rules for analysis and problem solving according to the new Portfolio Management Process	To develop FAs interpersonal and communication skills	To develop FAs cognitive skills related to the use of a new portfolio management computer system	To raise awareness of the bank's policy on sexual harassment; to enhance motivation for what the bank has defined as respectful workplace behaviours
Date offered	January 2000	July 2001	July 2001	August 2001	November 2000
Audience size	310 participants	173 participants	210 participants	115 participants	200 participants
Sample size of learner reaction evaluation	1,843 respondents	470 respondents	456 respondents	384 respondents	1, 194 respondents
Number of receiving sites	31 sites	23 sites	30 sites	25 sites	Not available
Duration of program	145 min	129 min	129 min	121 min	140 min
Format of presentation	Expert interview	Interactive lecture	Interactive lecture	Interactive lecture and expert interview	Expert interview
Number of instructors/presenters	4	2	2	2 (2 additional presenters joined broadcast in final 10 minutes of program)	2
Precourse work	None	1 ½ to 2 hours in self-study guide	1 ½ to 2 hours in self-study guide	3 ½ to 4 hours in self-study guide	15 – 20 minutes to read a brochure

and work processes for Trust Company heritage employees. Nevertheless, the training was offered to *all* Financial Advisors after the merger. The rational for this global approach to providing training was that it would create an organization-wide, standardized approach to managing customer portfolios. Training was conducted by two instructors.

- **Satellite Session #3** – this satellite session represented the second broadcast in the three-part *Portfolio Management* program (described in satellite session #2). This training session continued to debrief the process steps introduced in Satellite Session #2, using a similar instructional format. Content presentation included a number of video scenarios that role modelled desired behaviours.
- **Satellite Session #4** – this satellite session represented the third broadcast in the three-part *Portfolio Management* program (described in satellite sessions #2 and #3). In addition to concluding the portfolio management process steps, this training also debriefed learners' understanding of the new *Contact* portfolio management software, which Financial Advisors were required to learn on their own using a self-study guide. Content presentation in this session also included a number of video scenarios that role modelled desired behaviours.
- **Satellite Session #5** – this satellite session was titled *Respect in the Workplace* and provided training on the bank's sexual harassment policy and how it applies to various workplace situations. The broadcast provides an example of an "attitude change and motivation enhancement" training application. The content presentation utilized a number of video scenarios depicting possible incidents of sexual harassment which learners were required to analyze and discuss. In addition to the instructor, an internal subject matter

specialist provided expert commentary and responded to participants' questions. All new employees are required to participate in this training as part of their orientation to the organization and its policies.

Bank employees. An initial group of twenty (20) Bank employees was identified as potential interview participants. These employees were selected from student rosters, provided by *Learning & Development* department for the period July 2001 to August 2001, so as to ensure that employees selected to participate in this study would have had at least one satellite learning experience within the six months prior to being interviewed.

Participants were interviewed within two months of the bank and trust company branches merging into the new organizational entity (i.e., referred to as "the Bank"). Since the merging organizations were defined by very different corporate cultures which might have an impact on the results of this study, the heritage of employees was identified by labels derived from the corporate colours of their former institutions. Pre-merger Bank heritage employees were identified as "Green," while Trust Company heritage employees were identified as "Red." The initial group of employees was also selected on the basis of ensuring maximum variation sampling with respect to six key learner descriptors:

- Gender;
- Age;
- Management and non-management job roles;
- Degree of experience with satellite as a learning medium;
- Geographic area; and
- Organizational culture.

Information packages were sent to the initial group of employees containing a letter

describing the nature and purpose of this study and an "informed consent" form requesting the employee's agreement to participate in the research. Approximately a week after the packages were sent, I followed-up with a telephone call to each employee to confirm their intent to participate in the study. Thirteen out of the initial group of 20 employees agreed to participate in the study. In each case, non-participating employees cited time limitations and a high volume of work related to the recent bank-trust company merger, as reasons for declining to participate in the research.

After completing the first 13 interviews, a number of theoretically useful concepts had begun to emerge. Based on these apparent themes and patterns, I refocused efforts on identifying additional theoretically useful cases that might test or extend the theory that was beginning to emerge from the interview data collected thus far. Ten additional employees were selected and contacted as per the process described above. Six employees in the second sample group agreed to participate in the study; the others cited "no time" in declining to participate.

Of the 30 employees contacted in total, 19 people agreed to be interviewed for this study. Table 3 describes the sample group of interviewees.

Table 3. Interview Participants

Descriptor	Sample Group
Gender	Male: 5 Female: 14
Age	20-30 yrs : 6 31- 40: 10 41-50: 3
Organizational Culture	Trust Company heritage employees: 6 Pre-merger Bank heritage employees: 13
Management/ Non-management	Management: 4 Non-management:: 15
Degree of experience with satellite	1-3 satellite sessions: 6 4-9 satellite sessions: 5 10 or more satellite sessions: 8
Geographic region	Ontario: 13 New Brunswick: 1 Nova Scotia: 2 Alberta: 3

Phase 2. Data Collection

In this second phase, the researcher's objective was to develop a rigorous data collection protocol by employing multiple data collection methods. This is consistent with the grounded theory approach, which advocates the use of multiple data sources converging on the same phenomenon. Glaser and Strauss (1967) refer to these as "slices of data" and state:

> In theoretical sampling, no one kind of data on a category nor technique for data collection is necessarily appropriate. Different kinds of data give the analyst different views of vantage points from which to understand a category and to develop its properties; these different views we have called *slices of data.* While the [researcher] may use one technique of data collection primarily, theoretical sampling for saturation of a category allows a multifaceted investigation, in which there are no limits to the techniques of data collection, the way they are used, or the types of data acquired (p. 65).

Data collection was conducted using a multi-instrument approach, employing multiple techniques in order to apply the principle of triangulation – obtaining information from multiple sources, using varied methods. This study applied the synergistic approach of data

triangulation by incorporating both quantitative and qualitative data, gathered through multiple techniques, in order to enhance construct validity, internal validity and reliability.

Historically, the use of quantitative data was linked with an emphasis on verification of theory, while generation of theory implied the use of qualitative data in a non-systematic and non-rigorous way, in conjunction with the researcher's own logic and common sense (Glaser & Strauss, 1967, p. 15). However, in the grounded theory approach, Glaser and Strauss believe that each form of data, quantitative and qualitative, are useful for both the generation and verification of theory (p. 18). They write:

> *in many instances, both forms of data are necessary* – not quantitative used to test qualitative, but both used as supplements, as mutual verification and, most important for us, as different forms of data on the same subject, which, when compared, will each generate theory (p. 18).

Quantitative Data Collection. Quantitative data were used to primarily discover possible factors impacting learner perceptions of interaction in satellite training, and secondly to corroborate the findings from qualitative data. Quantitative data were collected from reaction evaluation reports compiled by *Learning & Development* department. These reports summarized learner responses to three satellite training programs, composed of five different satellite sessions, offered from January 2000 to August 2001. The sample size of the combined learner population included in these reaction evaluation reports was 4,347 individuals (see Table 2).

Flanders-type Interaction Analysis. Quantitative data collection also included coding the types and frequency of interaction I observed on videotapes of five different satellite training broadcasts conducted by the *Learning & Development* department in the period from January 2000 to August 2001. These satellite broadcasts were selected as representative samples of the training programs for which *Learning & Development* had compiled the cumulative

reaction evaluation reports.

The interaction analysis instrument used in this study is based on the Flanders' Interaction Analysis System (FIAS) introduced by Flanders and Amidon (1963, in Langer, 1972) as both a research instrument and a tool to support teacher training programs. The FIAS is used in classroom observation to classify all teacher-student verbal behaviours within 10 categories at specified time intervals, or whenever there is a change in verbal behaviour within a single unit of time. The categories are then entered into a matrix, which permits an examination of the emergent patterns of interaction (Langer, 1972, p. 10). The original FIAS is complex and requires extensive training on the part of the user to ensure reliable application of the tool (Langer, 1972; Freiberg, 1981).

I had first come across the notion of using a Flanders-type interaction analysis instrument in the work of Williams and Gillard (1989). These authors reported the use of a similar tool to provide developmental feedback to satellite instructors at the University of the South Pacific. I found the potential of interaction analysis an intriguing way to make the abstract concept of interaction more tangible and therefore more understandable through analysis.

Although a Flanders Interaction Analysis System tool currently exists, I found that it was necessary to design a separate analysis instrument specifically for use in this study. The reasons for designing a new interaction analysis instrument are explained below:

1. The original FIAS was designed to be used in a face-to-face classroom environment. As such, it did not reflect the construct of interaction in distance education, as described by Moore (1989) and Hillman et al. (1994), which forms the basis of this study. Consequently, I needed to design an interaction analysis instrument that reflected the

conceptual framework of learner-interface, learner-content, learner-instructor and learner-learner interaction.

2. The original FIAS has received much criticism for the distinctly teacher-centric focus that underlies its coding system. Eight of the ten codes describe teacher behaviours (Langer, 1972; Chadbourne. 1981). Since the purpose of this study was to focus on learner rather than instructor behaviours, it was necessary to design an analysis instrument with a more learner-centric coding system. The numeric system used to record learners' interaction behaviours in satellite training is shown in Table 4.

I developed an interaction analysis instrument similar to the one used by Williams and Gillard (1986). However, unlike the Williams and Gillard tool, this instrument consists of a system of numeric codes that focus on incidents of interaction from the *learner's* perspective. In the Williams and Gillard instrument, the focus is on tutor behaviours since only two of the thirteen codes describe learner behaviours.

My goal in creating the interaction analysis instrument used in this study was to produce a tool with a fairly simple taxonomic structure and definitions. This instrument was field tested and refined in order to establish categories that would describe any possible occurrence of interaction in satellite broadcasts. At the same time, these categories needed to be mutually exclusive so that the observer cannot describe an occurrence with more than one category.

Using the coding system described in Table 4, numeric symbols corresponding to learner interaction behaviours triggered throughout each satellite training broadcast were recorded:

- At a rate of one per 30 seconds (using the electronic time counter on the S-VHS video player unit); and/or

Table 4. Flanders-type Interaction Analysis System

Code	Learners' Interaction Behaviours	"Triggers" for Learner Behaviours
0	Lack of Interaction	Technical difficulty at the studio and/or at sites
	Learner-Interface Interaction	
1	Listens to instructions, protocols	Instructor provides instructions, describes protocols for communicating, interacting
2	Uses handset to respond to a question	Instructor asks for a response to an electronic or "call-in" question
	Learner-Content Interaction	
3	Listens to instructor make content presentation	Instructor presents lecture; responds to learner's question
4	Completes individual written exercise	Instructor assigns individual exercise
	Learner-Instructor Interaction	
5	Listens to instructor's question and formulates a response	Instructor asks question (e.g. multiple choice questions, provides debrief of individual written exercise)
6	Receives and processes instructor's feedback	Instructor shows summary results to electronic questions; provides debrief of individual written exercise
7	Signals instructor using the handset "Signal" key	Learner-initiated communication
	Learner-Learner Interaction	
8	Listens to peer debrief of discussion exercise (instructor initiated)	Instructor calls on spokespersons at sites to call in and debrief small group discussion exercise
9	Listens to peer-initiated comments/questions	Instructor invites learners to call in with questions/comments
10	Engages in discussion with peers at site	Instructor assigns small group/pair discussion exercise
11	Engages in unstructured social interaction with peers at site	There is a "break" in the broadcast

- Each time there was a change in learner interaction behaviour.

In other words, the occasion for recording a learner interaction behaviour was characterized by either a passage of time (i.e., 30 seconds) or, a change in stimulus events. Numeric codes were entered directly into an Excel spreadsheet.

Simon and Burstein (1985) state that "when linking an abstract concept to empirical variables, you must attend to both *reliability* and *validity"* (p. 209). The authors define "reliability" as essentially "repeatability." A measurement procedure is considered to be highly reliable if it produces the same result in the same circumstances, time after time, when it is used by the same researcher (intra-rater reliability); and, when it is used by different people in the same circumstances (inter-rater reliability) (p. 209).

The interaction analysis instrument used in this study was subjected to a combination of intra- and inter-rater reliability tests. In the first case, I used the interaction analysis instrument to record two sets of interaction codings for the same 20-minute segment of the satellite session #1 videotape. A comparison of the codings indicated a 96% intra-rater "repeatability" (i.e., similarity) rate between the two sets of codings.

To verify inter-rater reliability, I asked a colleague to complete two separate codings of the same 20-minute segment of satellite session #1. The first coding completed by my colleague showed a 78% repeatability rate to my second coding of the same video segment. The colleague's subsequent coding, which took into account his increased familiarity with using the interaction analysis instrument, showed a slightly higher repeatability rate of 86%. Because the coding process is vulnerable to a certain degree of subjective interpretation by the observer, I was the only researcher involved in collecting the data used for interaction analysis. This helped to insure greater consistency and reliability of data collected for the purposes of comparative analysis.

Simon and Burstein (1985) state that while reliability is necessary for adequate measurement, this criterion alone is not sufficient. A measurement instrument must also be *valid;* that is, it must measure what it is supposed to measure (p. 210). The validity of the

interaction analysis instrument was based on a logical, albeit somewhat subjective, application of interaction categories suggested in the conceptual frameworks proposed by Moore (1989) and Hillman et al. (1994). In specifying which variables represent an abstract concept of interaction, I was guided by my own experience with satellite training *and* by an emergent understanding of the variables through the comparative analysis of data.

I encountered a particular dilemma in deciding how to code the occurrence of an individual learner "calling in" to the instructor. In Moore's conceptual framework, this activity is categorized as "learner-instructor" interaction; consequently, this was also my initial categorization of this activity. However, after analyzing the emergent themes in the qualitative data gathered through learner interviews, it became evident that learners had a very different interpretation of satellite-mediated "call-in" communication with instructors. Clearly, the learners' impression was that when one of them was speaking directly with the instructor, other learners are listening. Therefore, from the learners' perspective, the individual, in speaking to the instructor, was indirectly addressing the collective learner audience, making this a form of learner-learner interaction. Since the goal of this study was to examine the phenomenon of interaction from the perspective of the distance learners, I determined that the research should be guided by what learners were reporting as *their* perceptions, and not by theoretical propositions suggested in the literature. For this reason, I made the decision to code the instances of individuals "calling in" to the instructor as *learner-learner*, rather than learner-instructor interaction. These calls were coded as "8" if learners were responding to a debrief to a question/exercise initiated by the instructor. Calls were coded as a "9" if they represented a question or comment initiated by the learner during a "question and answer" portion of the training.

Langer (1972) argues that instruments like the Flanders Interaction Analysis System have some internal problems that must be taken into account if such a tool is to be used for research purposes (p. 10). One weakness of Flanders' coding system, and similarly the system used in this study, is that it is basically a multiple discrimination problem. In other words, the occasion for recording a category code corresponding to a learner interaction behaviour is characterized by *either* the passage of time (30 seconds) *or* a change in stimulus event (Langer, 1972, p. 12). This multiple discrimination problem was an unavoidable factor in this study, where multiple codings were found to occur at a rate of 7% to 12%, depending on the satellite session. This error rate was determined by comparing the number of codings to the total number of 30-second intervals that occur in the broadcast's total running time. The number of codings exceeded the number of 30-second time intervals by 7% to 12%, confirming that multiple codings did occur during data collection.

It must be emphasized at this point that my intent in designing and using an interaction analysis instrument was *not* to produce a precise recording device in order to yield exact quantitative data of interaction at 30-second intervals. Such a preoccupation with accuracy in data collection is a characteristic that is more appropriate to studies aimed at *testing* rather than *generating* theory. Glaser and Strauss (1967) write:

> In discovering theory, one generates conceptual categories or their properties from evidence; then the evidence from which the category emerged is used to illustrate the concept. The evidence may not necessarily be accurate beyond a doubt (nor is it even in studies concerned with accuracy), but the concept is undoubtedly a relevant theoretical abstraction about what is going on in the area studied. Furthermore, the concept itself will not change, while even the most accurate facts change (p. 23).

Glaser and Strauss add that verifying as much as possible with as accurate evidence as possible is necessary while one discovers and generates theory – but not to the point where verification becomes so paramount as to stifle generation (p. 28).

Consistent with these tenets of grounded theory, my goal with respect to the interaction analysis instrument was to create a tool that might be used easily, with a fair degree of objectivity and consistency, so that observations of interaction during different satellite broadcasts might be *compared.*

Qualitative Data Collection. Qualitative data were used to understand the underlying relationships between factors impacting learners' perceptions of interaction in satellite training, thereby providing rationale for a theory which seeks to describe such interaction. Qualitative data collection began during the literature review phase, when I examined transcripts of a focus group conducted in August 2001 by *Learning & Development* department. The focus group was conducted as part of *Learning & Development's* formative evaluation for a new satellite training program, and provided some useful insights to learners' general perceptions and experiences with satellite training.

The majority of qualitative data, however, was collected through one-on-one telephone interviews with 19 Bank employees. The interviews were conducted using a semi-structured interview approach, following a general outline of 34 predetermined questions. Since this study was intended as exploratory research, participants needed to feel free to expand on their answers and to raise issues which I, as the researcher, may not have considered in advance. The semi-structured interview format was ideal for this purpose because it allowed participants to respond freely, and afforded me the flexibility to probe for underlying factors or relationships between variables, consistent with the constant comparative approach of

grounded theory research. Interviews were between 30 minutes and 65 minutes in duration, with the average interview running approximately 45 minutes. All interviews were completed within a four-week period of time.

Whenever possible, and only with the express permission of participants, interviews were tape-recorded, enabling me to engage fully in the conversation with the participant, without the distraction of note-taking. Sixteen out of nineteen participants agreed to have their interview tape-recorded. I took manual notations in the three cases where participants declined permission to have the interview recorded.

Immediately after the interview, I transcribed the interview tape or manual notations into a retrievable database using a word processor. As I did this, I began to look for key issues and themes that were beginning to emerge from the data. I recorded direct quotes made by participants on the right side of the document, and notes pertaining to my own interpretations, analysis and observations in the left margin. This process of simultaneous data collection and analysis allowed me to make adjustments to the data collection process, refining and refocusing my questioning in light of the emerging findings. Glaser and Strauss (1967) state that:

> Joint collection, coding, and analysis of data is the underlying operation. The generation of the theory, coupled with the notion of theory as process, requires that all three operations be done together as much as possible. They should blur and intertwine continually, from the beginning of an investigation to its end (p. 43).

Furthermore, by overlapping data collection and data analysis, I was able to expand the theoretical sample of cases by identifying instances where additional interview participants would be needed to test or expand the emerging theory. This flexibility in the data collection process is described by Eisenhardt (1989, in Pandit, 1996, p. 6) as "controlled opportunism."

In collecting and interpreting data about a particular category, Glaser and Strauss (1967) state that the researcher will eventually reach a point of diminishing returns when additional interviews add little or nothing to the understanding of a category, its properties and relationship to other categories (p. 61). In grounded theory research, this point is referred to as "theoretical saturation." I applied the principle of theoretical saturation in determining when to terminate the data collection phase in this study. Data collection ceased when I judged that further sampling and additional interviews were no longer contributing significant new information (i.e., no new categories were revealed) to what had already been discovered in the theory building process.

Phase 3. Data Ordering

The data ordering scheme that researchers select to organize their methodological approach provides a good indicator to the underlying assumptions of a study. Glaser and Strauss (1967) acknowledge that there are various types of studies that go by the name of "comparative method." Recognizing that *not* all grounded theory inquiry needs to necessarily begin with a conceptual "blank slate," they write: "some comparative analyses are made in the service of theories that are accepted as so correct and so useful that researchers wish merely to contribute to them in minor ways" (p. 30). This study is an example of this type of comparative analysis which, through its research questions, seeks to generate new hypotheses in order to provide "clarification" or "elaboration" of the commonly accepted theoretic framework of interaction proposed by Moore (1989) and Hillman et al. (1994).

This presupposition is evident in the data ordering scheme used throughout this study. I consistently applied the construct of interaction in distance education proposed by Moore (1989) and Hillman et al. (1994) as an organizing scheme to facilitate the collection,

recording and analysis of data. For example, coding of interaction observed in the five videotaped satellite broadcasts was organized as per the four types of interaction. Likewise, the 34 predetermined interview questions were also conceptually grouped into the four sub-categories of learner-content, learner-instructor, learner-learner and learner-interface interaction.

Phase 4. Data Analysis

Data analysis is a critical component of grounded theory building research. Although this process is discussed separately here, it must be emphasized that data collection, data ordering and data analysis were interrelated phases that occurred concurrently and iteratively throughout the research process.

Concepts are the basic units of analysis since it is from conceptualisation of data, not the actual data per se, that theory is generated:

> Theories cannot be built with actual incidents or activities as observed or reported; that is, from "raw data." The incidents, events, happenings are taken as, or analyzed as, potential indicators of phenomena, which are thereby given conceptual labels...Only by comparing incidents and naming like phenomena with the same term can the theorist accumulate the basic units for theory (Strauss & Corbin, 1990, p. 7).

Quantitative Data Analysis. Glaser and Strauss (1967) state that:

> quantitative data are so closely associated with the current emphasis on verification that its possibilities for generating theory have been left vastly underdeveloped.... typically, discovery made through quantitative data is treated only as a by-product of the 'main work' – making accurate descriptions and verifications" (p. 185).

Glaser and Strauss advise researchers to approach qualitative data analysis with "the freedom and flexibility that we claim for generating theory" (p. 186). They stress that what is relevant

for theory building is the general categories and properties and general relationships between them that emerge from the quantitative data.

In analyzing quantitative data, I endeavoured to harmonize the "freedom and flexibility" needed for theory generation with the rigour and accuracy demanded of disciplined inquiry. In some cases, I was involved in analyzing previously collected quantitative data, called "secondary analysis" by Glaser and Strauss (1996, p. 187). Analyzing the reaction evaluation reports compiled by *Learning & Development* department is an example of secondary analysis used in this study. This data proved valuable because it provided large-scale descriptions of the Bank's learner population that would otherwise have been too time consuming and too costly to collect. One limitation of secondary analysis, noted by Glaser and Strauss, is that it is difficult to pin down the accuracy of findings, in what is necessarily a second-hand view, without much knowledge of the collection procedures and meanings of data (p. 188). Also, because learner populations are constantly changing, there is no way of knowing whether quantitative reaction evaluation data collected some years ago still applies to the learner population. However, Glaser and Strauss maintain that the problem of accuracy is not as important for *generating* theory about a population as it is for *describing* a population or verifying a hypothesis. What *is* relevant for theory building, are the general categories, properties, and relationships, revealed through secondary analysis (p.189).

Primary analysis of quantitative data collected through observation of interaction in videotaped satellite broadcasts was done using the coding scheme of the Flanders-type interaction analysis instrument. I entered numeric codes directly into an Excel spreadsheet to capture both the frequency and variety of interaction observed in the videotaped satellite broadcasts. Using this software application, the codes were then plotted on a graph to

produce a graph line depicting an interaction "profile" for each satellite broadcast. Quantifiable data depicting the frequency and variety of interaction observed were analyzed to show ratios and suggest relational factors between the four possible types of interaction.

Interaction profiles were compared to learner reaction evaluation data to identify any possible relationships between the level of interaction (i.e. frequency and variety) and learner satisfaction with the training. I then made notes about the variables and their possible relationships according to the patterns that were beginning to merge through data analysis. These notations were later labelled and coded so that they might be integrated with concepts and categories identified through qualitative data analysis.

Qualitative Data Analysis. Babchuk (1996) states that the heart of grounded theory analysis is the coding process, which simultaneously reduces data by dividing it into units of analysis and assigns a code to each unit. There are three types of coding: open, axial, and selective (p. 2).

In this study, I began data analysis with the open coding process, which involved the breaking down, analysis, comparison and categorization of data. Calloway and Knapp (2001) note that a critical data reduction decision in qualitative studies is to determine the unit of analysis (p. 2). In the open coding of qualitative data, I used key word analysis to extract sequences of words from the interview transcripts. These sequences, or "mentions," were labelled based on a qualitative evaluation of each sentence of each interview and grouped together via constant comparison, to form categories and properties.

All grounded theory studies are defined by the data coding or labelling scheme the researcher decides to use. Some of the codes applied in this study were suggested by the conceptual framework of interaction used to develop the research questions. Other codes

were suggested by patterns in the data itself (e.g. "environmental distractions," "risk," "side-talk," etc.). It is important to emphasize that in qualitative analysis codes are used to categorize data rather than to quantify it. This means that, initially at least, less importance was placed on the number of times an individual comment was categorized.

Through systematic coding, concepts, issues and incidents, emerging from the interaction analysis of the five videotaped satellite broadcasts, and from the interview transcripts, were labelled and grouped together into theoretical categories to describe key themes or variables indicated by the data. Eventually, a few key categories began to emerge with high frequency of mention. At the same time, each line of the interview transcripts and each piece of quantitative data was compared to others to generate theoretical properties for the key categories. In this way a list of key categories was identified and pruned, described and then reformulated as properties emerged.

Whereas open coding breaks data down into concepts and categories, axial coding re-assembles the data into new ways by making connections between a core category and its sub-categories. During axial coding, I wrote memo notes on small index cards about possible causal conditions for phenomena observed in the data analysis. I carried these cards with me at all times, pausing to jot down ideas about relationships that linked categories to each other, as they occurred to me. These index cards provided a very effective system for capturing the highly intuitive aspects of theory building.

The index cards also provided an easy way to sort and structure ideas during the selective coding process when I began to integrate categories to a defining core category. The physical process of arranging the cards on a large table, sorting and resorting them into possible patterns and relationships proved to be the catalyst for the emergence of a single

core category that would become the nucleus of my theory – "Learner Motivation." As the theory began to solidify, categories were integrated and synthesized into this core category and its subset categories, delimiting and reducing the universe of qualitative and quantitative data. At this point, I began to develop a narrative to delineate hypothetical relationships between the core category and the subcategories, formulating hypotheses that would become the basis of a theoretical model.

Verification. Verification of a tentative theoretical framework occurs through additional data collection or by going back to original interview participants to validate the conceptual framework. Throughout this study, verification of findings occurred in three of ways:

1. I continually compared findings in qualitative and quantitative data analysis, looking for corroborating evidence that might support the validity of those findings.
2. Once certain patterns and themes began to emerge, I conducted a second round of interviews with six additional participants, that might test or elaborate those findings.
3. Towards the end of the data analysis I reconnected by telephone with two of the original interview participants who expressed a more than passing interest in the outcome of this study, and who impressed me as being particularly attuned to their experiences as satellite learners. In describing my emerging hypotheses to these individuals, I was able to validate that the categories and integrated relationships between them adequately described the social and psychological dimensions of the phenomenon of "interaction in satellite training," from the perspective of these learners.

Phase 5. Literature Comparison

In the grounded theory approach, two points need to be made about the place and importance of literature. The first point is that in an emergent study, the literature is emergent. In other words, the researcher will not know at the beginning of the study which literature, later, will turn out to be relevant (Dick, 2001, p. 9). The second point is that literature is not given a position of privilege when compared to empirical data; instead, literature is treated, and given the same status, as other data.

It should be recognized, however, that there is considerable debate about the place and role of literature throughout the theory building process. Some scholars maintain that referencing literature, as another form of data, should be included in the constant comparative methodology as a way of verifying and delimiting the emerging theory. Glaser's (1992, in Dick, 2001) approach discourages referencing literature during the data collection and analysis stage since this may constrain the researcher's coding and memoing (p. 9). Nevertheless, I deemed it sensible to refer to literature during data collection and analysis – accessing "relevant literature as it became relevant." I can add, however, that I endeavoured to treat literature as another form of data and not to give it elevated status in relation to empirical data.

In the final phase of the process I compared the emerged theory with the extant literature and examined what is similar, what is different and why (Pandit, 1996, p. 9). Pandit maintains that comparisons of the emerged theory with conflicting frameworks represented in the literature improves the construct definitions and, therefore, the internal validity of the research. Comparisons with similar frameworks serve to improve external validity by establishing the domain to which the study's findings can be generalized (p. 3). This repeated

emphasis on verification and validation of theory and hypotheses throughout the course of the research project reflects Strauss and Corbin's (1990) grounded theory methodology. Glaser, (1992, in Dick, 2001) on the other hand, is critical of this approach because he regards theory *generation* versus theory *verification* as the focus of research inquiry. In Glaser's opinion, verification of theory falls outside of the parameters of grounded theory.

The emergent theory of interaction in one-way video, two-way audio satellite corporate training was compared with the extant theories in the broader field of adult motivation to explain learners' participation in educational activities. This revealed the discovered theory to resonate in some ways, with Rubenson's (1977, in Cross, 1988, pp. 115-119) "Expectancy-Valence" model and Cross's (1988, pp. 124-131) Chain-of-Response (COR) conceptual framework.

Summary

This study applied the grounded theory method of qualitative inquiry to examine the phenomenon of learner interaction in one-way video, two-way audio satellite-based corporate training. The purpose of this research was to generate a theoretical framework that might guide distance training practitioners in designing interaction in satellite-based instruction.

The research was undertaken using the holistic case study approach in which the Bank's Satellite Learning Network was examined as the case of practice. The research design utilized both quantitative and qualitative data collection methods, including analysis of historical records, and data gathered through 19 learner interviews. Consistent with Strauss and Corbin's (1990) approach to grounded theory research, this study followed the five analytic, but not strictly sequential, phases of research design: data collection, data ordering, data analysis and literature comparison.

CHAPTER IV

FINDINGS AND INTERPRETATIONS

Introduction

The purpose of the constant comparative method of joint data collection, coding and analysis, described in the previous chapter, was to structure an inquiry around the eight research questions that defined this study, and in the process to generate a theory that describes the phenomenon of interaction in satellite training. The findings, derived through analysis of qualitative and quantitative data, are organized primarily in terms of the research questions formulated for this study. Data gathered through the interaction analysis of the five videotaped satellite broadcasts is summarized in Table 5. As appropriate, evidence in the form of direct quotes from participant interviews or references to statistical data was cited to illustrate and give "life" to the concepts being described with respect to each question. In all cases comments extracted verbatim from the transcripts of interviews are reported anonymously; however, in instances where the experiences of Red and Green employees were deemed to be significantly different, comments are identified as "Red" or "Green."

Features that Constitute a Paradigm of Real-time Interaction in One-way Video, Two-way Audio Satellite Corporate Training

Even a cursory review of the literature suggests that there are many different models and configurations for satellite learning networks. Different network configurations may support different design and delivery capabilities that ultimately impact the type and quality of interaction that is possible through the network. This study describes the specific features that delimit interaction in the Bank's Satellite Learning Network.

Table 5. Interaction Analysis of Five Satellite Training Broadcasts

	% of Total Broadcast Time				
Learner Interaction Behaviours	**Satellite Session # 1**	**Satellite Session # 2**	**Satellite Session # 3**	**Satellite Session # 4**	**Satellite Session # 5**
0 – Technical difficulties (no interaction)	0.3	1.8	1.2	2.9	2.1
Learner-Interface Interaction					
1 – Listens to instructions, protocols	12.4	12.4	13.6	11.5	8.2
2 - Uses handset to respond to question	4.1	10.6	10.9	11.9	6.1
Total Learner-Interface Interaction	***16.5***	***23.0***	***24.5***	***23.4***	***14.3***
Learner-Content Interaction					
3 – Listens to Instructor make content presentation	52.4	23.8	21.3	31.7	22.2
4 –Completes individual written exercise	0	1.5	0	1.6	1.4
Total Learner-Content Interaction	***52.4***	***25.3***	***21.3***	***33.3***	***23.6***
Learner-Instructor Interaction					
5 – Listens to question and formulates response	5.2	11.7	11.6	12.8	5.7
6 – Receives and processes instructor feedback	7.9	16.8	18.2	10.3	16.8
7 – Signals to instructor	0	0	0	0	0
Total Learner-Instructor Interaction	***13.1***	***28.5***	***29.8***	***23.1***	***22.5***
Time spent attending to Instructor talk (1, 3, 5, & 6)	*77.9%*	*64.7%*	*64.7%*	*66.3%*	*52.9*
Number of instructors/presenters	*4*	*2*	*2*	*2*[1]	*2*
Total Number of calls received	*22*	*22*	*21*	*15*	*34*
Number of call-in questions	*12*	*0*	*0*	*1*	*14*
Number of electronic questions	*12*	*16*[2]	*10*[3]	*9*[4]	*16*

[1] Two additional presenters were brought in as an "expert panel" to answer call-in questions during the last 10 minutes of the broadcast.

Table 5. Interaction Analysis of Five Satellite Training Broadcasts (Cont'd)

	% of Total Broadcast Time				
Learner Interaction Behaviours	**Satellite Session # 1**	**Satellite Session # 2**	**Satellite Session # 3**	**Satellite Session # 4**	**Satellite Session # 5**
Learner-Instructor Interaction (Cont'd)					
8 – Listens to peers debrief discussion	7.3	9.2	9.3	6.2	9.7
9 – Listens to peer questions, comments	4.8	0	0	0.4	6.1
Subtotal (remote learner-learner)	*12.1*	*9.2*	*9.3*	*6.6*	*15.8*
10 – Engages in structured discussion with peers at site	2.1	12.2	13.9	10.7	14.6
11 – Engages in unstructured social peer interaction at site	3.5	0	0	0	7.1
Subtotal (face-to-face)	*5.6*	*12.2*	*13.9*	*10.7*	*21.7*
Total Learner-Instructor Interaction	***17.7***	***21.4***	***23.2***	***17.3***	***37.5***
Ratio of time spent in remote learner-learner vs. face-to-face learner-learner	*2.2:1*	*.75:1*	*.67:1*	*.62:1*	*1.6:1*
Number of small group discussion exercises	*1*	*2*	*4*	*3*	*3*
% Time spent in unstructured learner-learner interaction (i.e. breaks)	*.3%*	*0%*	*0%*	*0%*	*7.0%*

[2] 31 Of the electronic questions, in total, only 16 questions were content related; the other 15 questions were asked at the end as part of the reaction evaluation.
[3] 27 Of the electronic questions, in total, only 10 questions were content related; the other 15 questions were asked at the end as part of the reaction evaluation.
[4] 29 Of the electronic questions, in total, only 9 of these were content related; the other 20 questions were asked at the end as part of the reaction evaluation.

General description

The Pre-merger Bank implemented a satellite learning network in 1998 to offer one-way video, two-way audio instructional broadcasts. The network's design allows learners at distant sites to see and hear an instructor through a TV monitor. However, the instructor, broadcasting from a central studio location, can only hear from learners who call in through audio links using telephone lines, or who respond to instructor posed questions electronically using individual learner response units that resemble telephone handsets. The former Trust Company organization did not use satellite technology to train its employees.

Studio and site

The network is comprised of a rented broadcast studio in Toronto (a large Canadian city), and 262 distant sites located in bank branches and offices across Canada. All of these sites are equipped with a satellite dish and TV monitor to receive satellite signals. Included in the total number of distant sites are 115 "interactive" sites that are specially equipped with site controller units and a number of devices called "handsets" that allow for one-way video, two-way audio communication. The other 163 sites are "non-interactive," which means they are equipped to only receive video and audio satellite signals. Participants at non-interactive sites cannot communicate directly with instructors in the broadcast studio. Both interactive and non-interactive sites are used for broadcasts involving corporate communications. However, only interactive sites are used during instructional broadcasts. This study reports on the experiences of learners at interactive sites only.

Transmission of signal

During a satellite broadcast, the instructor's message is transmitted from a central studio site to a receiver on a satellite that is in a stationery orbit above the earth. The signal is then

downlinked to a ground receiver where it is transmitted to satellite dishes at distant sites that are tuned to the signal's transmission frequency. The "footprint" or geographic area that can potentially receive the downlinked signal includes all of Canada. This means that the Bank has the capability to *simultaneously* broadcast an instructional or communication message to receiving sites across Canada. From time to time atmospheric disturbances such as severe storms or radiation bursts from solar flares can interfere with satellite signal transmission. Likewise technical problems during a broadcast resulting from equipment failure or human error can also be manifest as a loss of communication capability between the studio and the receiving sites.

Handsets

Learners attending satellite training sessions at an interactive site are each provided with a handset. The number of handsets available at each site therefore determines the learner capacity at interactive sites. The handsets allow learners to log-in, using their employee payroll number at the beginning of a satellite training session, thus providing an automated attendance record of participants. The system has the capacity to log on 1,933 participants simultaneously, but a typical class size ranges from 100 to 300 learners. The handsets are equipped with microphones that allow learners at distant sites to communicate with the instructor; such communication is broadcast in real time to all distant sites.

The handsets also allow an instructor to ask "electronic" questions (i.e. true or false, yes or no, and multiple choice) that require learners to key in a response by pressing a numeric key on their individual handset. The system immediately provides the instructor with a graph chart showing the aggregate distribution of correct and incorrect responses. This chart is then transmitted to the receiving sites during the debrief of each question. The system is capable

of tracking electronic responses by individual learner; however, the Bank does not utilize this function at this time. The handset also includes a special function key that the learner can use to send a "signal" to the instructor. The message sent by the "signal key" may vary depending on the meaning the instructor wishes to assign to this function. For example, depressing the signal key can send a message to the instructor that a learner is confused or that the presentation is moving too slowly or too quickly. At the Bank, the signal key is most often used for anonymous opinion polling.

Quality of audio signal

The audio signal between the studio and receiving sites is generally very good. However, a feature of the network is that when the learner speaks to the instructors through the handset, the learner cannot hear their voice through the TV monitor at their site, causing them to question if the instructor is receiving their signal. Also, verbal communication is perceived as noncontiguous as there is a slight delay of approximately one to two seconds between the time that a learner speaks and the time that the instructor reacts to the message. From time to time, these features result in some awkward moments of miscommunication between the instructor and the caller.

Instructional paradigm

It is also important to note that unlike many satellite configurations in academic settings, the Bank does not conduct satellite training in the presence of a live studio audience. This practice is avoided because it is believed to have a negative impact on the instructor's ability to interact with the remote learner, in effect, putting participants at receiving sites in the position of "second class citizens" or "onlookers" to the learning event. Instead, instructors focus all of their energy on teaching to the "cold eye of the camera."

Learning applications

The satellite learning system is used to deliver a wide array of programs ranging from one-way corporate communications on new policies and procedures to interactive instructional events designed to develop employees' product knowledge, selling skills, and interpersonal working relationships.

Student enrolment

Studio and satellite time rental is very costly, averaging approximately $2,000 per hour. For this reason, the size of the training audience for a satellite session is determined more by economies of scale and "return on investment" than by principles of instructional effectiveness. Therefore, large audiences per session tend to be a defining feature of satellite corporate training.

In most cases, employees are identified to attend satellite training events based on job title rather than on the individually diagnosed need for personal skill development. This practice casts a very broad training net in the organization; therefore, it is highly likely that the training audience for any given satellite broadcast would include both novice as well has highly knowledgeable and skilled employees. The *total* training audience of a typical satellite program is approximately 2,000 employees, on average – however, as noted earlier the total number of learners who might be tuning in to a single broadcast is far less (100 to 300 individuals, on average).

Site coordinators

An employee is identified at each receiving site to be the site coordinator for that location. This person is responsible for the set up and maintenance of the satellite equipment at that site. Specifically, site coordinators are responsible for ensuring that the sites are

prepared to receive learners prior to a broadcast and in some cases they are also required to collect qualitative paper-based feedback from learners at the end of a satellite session. Site coordinators also have some limited problem-solving capability in the event of a technical system problem, but typically they are guided by specially trained technicians at the central studio in order to resolve any system failure. Site coordination responsibilities are regarded as informal "add ons" to employees' other job accountabilities, which means that they are currently carried out with varying degrees of enthusiasm and commitment. As a result, the quality of the physical learning environment can vary from one satellite receiving site to another. Site-coordinators are not expected to remain in the room with learners during the satellite broadcast.

Instructional design and delivery

The instructional designers and instructors engaged in developing and delivering satellite training are specialists in their functional areas of designing or instructing but do not have specialized expertise specific to the medium of satellite. Designers are required to have the "generalist" capability to create programs for several media including classroom, text-based self-study, and computer-assisted training. Instructors alternate between classroom and satellite delivery.

Business drivers

Satellite training initiatives are driven by business needs. For example, the recent bank-trust company merger has created an urgent need to update employees' skills, in response to new opportunities, emerging competition and technological change. The Bank's satellite network plays a key role in enabling *Learning & Development* department to meet the latest training challenges created by the merger. Although the effort involved in producing

interactive satellite-based training is considerable, the rapid deployment of learning that satellite technology supports is generally recognized to be a strategic competitive advantage, providing a valuable hedge against the particularly short shelf life of knowledge in the financial services industry. The business case for satellite training is to provide timely, cost efficient, synchronous, quality controlled training to thousands of geographically dispersed Bank employees.

Instructional Strategies and Techniques that Define the Four Types of Interaction in Satellite-based Training

For the purposes of this study, the four types of interaction are defined by very specific types of learner behaviours and instructional strategies and techniques. A number of these instructional strategies and techniques intended to promote each of the four types of interaction were identified through observation of the five Bank satellite session videotapes. The type and frequency of the interaction behaviours, as observed through the interaction analysis of the five broadcasts, is summarized in Table 5. Instructional strategies and techniques designed to facilitate each type of interaction are described in this section.

Learner-Interface Interaction

For the purposes of this study, learner behaviours that delimit learner-interface were defined as:

- Listening to instructions and protocols about how learners will use the technology and/or instructional setting at the receiving sites to communicate and interact with the instructor and other learners; and
- Using the handsets to respond to an electronic or call in response to a question.

As Table 5 shows, satellite session #3 had the greatest percentage of total broadcast time (24.5%) devoted to learner-interface interaction. Satellite session # 5 spent the least amount of instructional time on this type of interaction (14.3%). Instructional strategies and techniques used to facilitate learner-interface interaction included:

- Interaction protocol;
- Paper-based job-aid and verbal instructions;
- Electronic responses and "call-ins";
- Activities to enhance learners' confidence in using the technology;
- Set-up;
- Visual reinforcement;
- Technical support; and
- Minimize technology distractions.

Interaction protocol. Instructors described the protocols of the technology, particularly as it related to how learners would use the handset system to communicate with the studio. They explained the format of the satellite session, the ways in which learners would be expected to actively participate in the learning event, as well as the benefits of doing so. Learners spent the most time listening to protocol instructions in satellite session # 3, with 13.6% of total instructional time. Satellite session #5 showed the least amount of instructional time spent in learner-interface interaction activities (8.2%).

Paper-based job-aids and verbal instructions. Learners were oriented in the use of the handsets for communicating and interacting during the broadcasts. A paper-based, graphical job-aid was provided at the front of learners' satellite session guides to orient them in the use of the handset and functions of the various keypad buttons. Instructors reinforced these

written instructions through verbal reminders just before or just after introducing an instructional stimulus (e.g., electronic question) which required learners to use the handset. For example, verbal instructions for how to use the handset to call in with a question or comment were offered immediately before learners were invited to call in.

Electronic responses and "call-ins." Instructors posed questions that required learners to either electronically respond by pressing a key on their handset, or to press the "Raise Hand" key and call in to the studio with a verbal response. Satellite session # 4 showed the highest rate of learners using their handsets to respond to questions posed by the instructor – 11.9% of instructional time. Satellite session #1 showed the lowest rate of handset responses at 4.1%.

Activities to enhance learners' confidence in using the technology. A part of each satellite training session was devoted to familiarizing learners with the technology and providing them with an opportunity to interact with their handsets. Specific activities were created to enhance learners' confidence in their ability to use the handset for communication and interaction. Within the first 10 minutes of each broadcast, instructors posed an example "electronic question" and/or a "call in" question to familiarize learners with use of the handset. These activities also served to establish an early expectation that satellite learning is an active, not a passive, process.

Set-up. Instructors verbally prepared learners before asking a question that required an electronic or "call-in" response. They also asked learner groups at receiving sites to rotate selection of "spokespersons" who would be responsible for calling in during the debrief of small group discussion exercises, thus preparing specific individuals for participating in this interactive activity.

Visual reinforcement. Studio technicians transmitted visual Microsoft PowerPoint slides of instructor-posed questions, small group discussion questions, and slides summarizing the key lecture points in order to help visually-oriented learners process the verbal information. Most of these visuals were text-based.

Technical support. A site coordinator was assigned at each satellite receiving location to ensure that the site equipment was functional and accessible, and to distribute any session materials to learners. Site coordinators also had limited technical problem-solving capabilities; however, because these individuals had other assigned job duties, they did not remain in the training rooms throughout the satellite broadcasts. Technicians in the central studio provided technical support through a toll-free telephone "hotline" number that periodically flashed on the TV monitor screen.

Technical system problems were evident to varying degrees in all of the satellite sessions. However, branch premises changes resulting from the recent bank-trust company merger caused considerable disruption to satellite installations and equipment. This contributed to a high incidence of technical problems during satellite sessions #2, #3 and #4. Satellite session #4 had the highest incidence of technical problems that interfered with instructors' ability to connect with learners at receiving sites. Instructors spent approximately 2.9% of total instructional broadcast time in dealing with technical problems. Conversely, satellite session #1 experienced the lowest incidence of technical difficulties; only 0.3% of instructional time was spend dealing with transmission problems.

Minimize technology distractions. Studio technicians attempted to minimize any distractions arising from the satellite technology by using structured silence and transmitting still images when learners were engaged in small group discussions at their sites or mentally

processing information in order to respond to an electronic question posed by the instructor.

Learner-Content Interaction

For the purposes of this study, learner behaviours that delimit learner-content interaction were defined as:

- Listening to instructors/presenters make content presentations;
- Listening to the instructor/presenter respond to a learner's "call-in" question;
- Completing individual reading/written exercises; and
- Note-taking during the broadcast[5].

As Table 5 shows, satellite session # 1 had the highest frequency of learner-content interaction during the broadcast, at 52.4% of total broadcast time; satellite session # 3 showed the lowest rate, at 21.3%. Three of the satellite broadcasts included some individual written exercises but the most common form of learner-content interaction was through instructor lectures or other forms of content presentation, including instructors responding to learners' "call-in" questions. Instructional strategies and techniques used to promote learner-content interaction included:

- Lectures and presentations;
- Precourse work;
- Written exercises; and
- Printed satellite session guides.

Lectures and presentations. Instructors made content presentations that utilized a variety

[5] Data about learners' note-taking behaviour was gathered through the interviews. However, this category of learner-content interaction was not included in the Interaction Analysis instrument since I did not have access to a receiving site in order to observe learners' note-taking behaviour directly.

of instructional presentation techniques, including lectures, demonstrations, role plays and video simulations. Content was also presented in the form of instructor responses to learners' "call-in" questions. Satellite session #1 had the highest percentage of time spent in instructor lectures and other presentations, at 52.4%, while satellite session #3 had the lowest percentage, at 21.3%.

All the satellite sessions included multiple instructors and/or guest speakers/experts. Satellite sessions #1 and #5 were presented entirely through an "expert panel" format in which the instructor interviewed a guest speaker(s) (see Table 2). Satellite sessions #1, #4 and #5 included a "question & answer" (Q&A) segment with an expert panel. Satellite sessions #2 and #3 included a Q&A segment with instructors only.

Precourse work. Four of the five satellite broadcasts included precourse work consisting of reading/written assignments that learners were required to complete before attending the satellite training. Satellite session #4 had the greatest amount of precourse work, approximately 3 ½ to 4 hours of reading and written assignments. Satellite session #1 had no precourse work (see Table 2). During the broadcasts, instructors attempted to integrate precourse assignments with learner-instructor and learner-learner interaction through discussion-based activities.

Written exercises. Three of the five broadcasts had instructors assigned a brief written exercise that learners completed individually at their sites. In each case the percentage of total instructional time spent in completing written exercises was less than 2%.

Printed satellite session guides. At each broadcast, learners were provided with satellite session guides. The guides included most of the visual PowerPoint slides used during the broadcast, as well as a section for learner note taking.

Learner-Instructor Interaction

For the purposes of this study, learner behaviours that delineate learner-instructor interaction were defined as:

- Listening to the instructor's electronic or "call-in" questions and formulating a response;
- Receiving and processing the instructor's feedback to electronic questions; and
- Sending an anonymous "signal" to the instructor using the handset "Signal" key.

As Table 5 shows, satellite session #3 spent the most time on learner-instructor interaction (29.8 %); satellite session #1 showed the least time (12.1%). Instructional strategies and techniques used to support learner-instructor interaction included:

- Electronic questions;
- Feedback;
- "Call-in" questions;
- Learner-initiated "signal";
- Learners' names; and
- Games and prizes.

Electronic questions. The most frequently used strategy for encouraging learner-instructor interaction was the use of electronic questions which required learners to key in a response using the numeric keypad on their handset. Question formats included: multiple choice, true/false and opinion survey. Instructors verbally posed these pre-formatted questions which learners simultaneously viewed on their TV monitor and then responded to electronically by pressing a key on their handset.

On a few occasions, the instructors also posed *ad hoc* survey-type questions. Learners were instructed to respond to these questions *anonymously* by pressing the "Signal" key on

their handset. In most cases these questions were pre-planned and scripted. However, in one instance the *ad hoc* question was truly spontaneous, instructor-initiated, and not a part of the instructor's script.

Satellite sessions #2, #3 and #4 included a number of "reaction evaluation" electronic questions that were asked at the end of each broadcast; because these questions were *not* related to the instructional content, they are not included in the numbers reported in Table 5 (see footnotes). Satellite session #5 included the greatest number of electronic questions with a total of 16 questions posed to learners. Satellite session #4 included the lowest number of questions (9).

Feedback. The instructor provided feedback to electronic questions by transmitting system-generated bar graphs depicting the aggregate distribution of learner responses to these questions, thus allowing learners to self-assess their response *vis-a-vis* their peer group's performance. The handset system also allows for the tracking of individual learner responses by employee payroll number; however, this functionality was not utilized in any of the five broadcasts. Satellite session #3 showed the most time spent by learners in processing instructor feedback, at 18.2%; satellite session #1 showed the least amount of time for this activity, at 7.9%.

"Call-in" questions. From time to time, instructors posed open or "call-in" questions that required learners to communicate using the microphone feature of their handset. Likewise, instructors invited learners to use their handsets to call in with their own questions. In four of the satellite sessions, learners were instructed to call in only during designated "question and answer" segments in the broadcast. In satellite session #5 learners were encouraged to call in with questions at any time during the broadcast. Satellite session #5 had the greatest number

of "call-in" questions posed by learners (14). Satellite sessions #2 and #3 had no "call-in" questions.

Learner initiated "signal". A review of the technical literature describing the capabilities of the handset devices indicated that learners use the "Signal" key on their handset at any time during the broadcast to send an anonymous message to the instructor. For example, depending on the protocol instructors wish to assign to the use of this key, its message might serve to indicate that learners are confused and need further clarification on an instructional point. However, none of the five satellite sessions utilized this particular functionality of the "Signal" key nor was this system capability explained to learners.

Learners' names. Whenever possible, instructors endeavoured to "connect" with callers by addressing them by their first names as identified by the handset system.

Games and prizes. Instructors used games and small prizes as incentives to encourage learners to participate in "call-in" activities. For example, instructors asked surprise "Quick Quiz Questions" at two or three points in the broadcast and awarded prizes to the first caller to provide a correct verbal answer to the question.

Learner-Learner Interaction

For the purposes of this study, learner behaviours that delimit learner-learner interaction were defined as:

- Participating in a small group discussion exercise with other learners at the site;
- Listening to other learners call in to debrief the small group discussion exercise;
- Listening to peers "call-in" with questions/learner-initiated comments; and
- Participating in unstructured social interaction with other learners at the site (i.e., during a break).

As the above behaviours suggest, learner-learner interaction can occur in two modes: face-to-face, with learners interacting directly with others at their site, and remotely, with learners interacting with people at other sites through the satellite technology.

Table 5 shows that satellite session #5 had the highest overall percentage of instructional time spent in learner-learner interaction, at 37.5%; 21.7% of instructional time was spent in face-to-face interaction and 15.8% was spent in remote interaction. Satellite session #4 spent the least amount of time on learner-learner interaction (17.3%); 6.6% of this time entailed remote interaction, while 10.7% was face-to-face. Instructional strategies and techniques used to encourage learner-learner interaction included:

- Climate setting;
- Small group discussion exercises;
- Debrief "call-ins";
- Relay questions; and
- Breaks.

Climate-setting. In satellite session #2 and #3 instructors encouraged learner-learner interaction by asking participants to take a few minutes at the beginning of the broadcast to introduce themselves to other learners at their site. In satellite session #5 learners were assigned a brief "ice breaker" discussion exercise that required them to work in small groups prior to the start of the broadcast. No climate-setting activities occurred in satellite sessions #1 and #4.

Small group discussion exercises. Small group discussion exercises were the most frequently used strategy for facilitating learner-learner interaction. Instructors assigned clearly defined discussion questions and instructed learners to form small discussion groups

of four or five individuals. Satellite session #3 had the greatest number of small group discussion exercises (4); satellite session #1 had the least (1).

Debrief "call-ins". During small group discussion exercises, each group selected a "spokesperson" to record the team's ideas and report these to the plenary group during the "on-air" debrief of the discussion exercise. Instructors invited spokespersons to call in using the microphone feature of the handsets, and share their group's ideas with the larger learner audience.

Relay questions. In at least one instance, instructors responded to a very technical "call-in" question from a learner by relaying this question to the larger learner audience. They invited other learners who had the necessary hands-on expertise to call in and suggest possible responses to the question being asked. This technique was not directly observed in any of the five videotaped satellite sessions but was reported by two interview participants.

Breaks. Two of the five satellite broadcasts included scheduled breaks which allowed learners to engage in unstructured interaction with peers at their sites. Satellite session #5 allowed the greatest amount of time for unstructured learner-learner interaction to potentially occur with 7% of instructional time spent in breaks. Satellite sessions #2, #3 and #4 did not include any break time.

The Contribution of Real-time Interaction to the Satellite Learning Experience

The drawbacks of synchronous interaction in terms of the restrictions of time and place it imposes on the learner are well documented in the literature and discussed in Chapter II of this study. What is less understood is the potential benefits real time interaction offers for learner satisfaction, particularly in a corporate training environment. At the time of this research, the Bank did not offer any forms of training that utilize asynchronous modes

interaction such as correspondence study or web-based study supported through e-mail interaction. Therefore, learners interviewed in this study were asked to compare the synchronous satellite learning experience to learning on their own through a self-study guide – the only other form of corporate training that did not incorporate synchronous interaction. Given this comparison, 17 of the 19 learners cited the *interaction* that is possible in satellite training as "definitely a plus." They identified the opportunity for clarification, i.e., for checking interpretations and "clearing up misunderstandings" related to the content, as the most obvious benefit of real time interaction. Many interviewees suggested that real-time interaction helps the organization convey a consistent message that is more uniformly understood by employees. This was recognized by many learners as a critical requirement in mobilizing a workforce to accomplish strategic business initiatives.

Learners found interaction in satellite training to be more dynamic than the print-based self-study mode of learning. They also cited the immediacy impact of a "live" learning event as an important element in creating a focus or "share of mind" for the learning effort. Many learners commented that without the imposed structure of attending a prescheduled learning event, they found it difficult to find the time or self-discipline to engage in learning activities on their own. Another advantage of synchronous interaction identified by some learners was the opportunity to meet others (face-to-face or remotely through the satellite medium) who were experiencing the same challenges as themselves.

The following comments illustrate learners' perceptions of the benefits of real-time interaction:

- "You actually hear someone and they can actually clarify; otherwise, when you read something you are only interpreting through your own eyes."

- "If you did have questions you could press the raised hand button."
- "You were also given the opportunity to meet with other people doing the same program."
- "If I really had a misinterpretation, and I was just doing the study guide, I would be left with that misinterpretation. Whereas, this helped keep me on track with respect to what the program was about."
- "We get so many binders, we breeze by them. Satellite forces you to see benefits in the binder."
- "Everyone perceives the same information differently. Satellite can help to ensure that everyone gets the same information and understanding so we're all marching to the same drummer."
- "It also gives people time to do the training. It forces people to set time aside for training which they might not otherwise be able to do on the job."
- "There is more life in the satellite training than just getting a self-study guide."
- "The interaction is definitely a plus."
- "Satellite can highlight the important points that the company wants brought to the attention of employees."
- "Satellite is more motivating. If you're in a self-study mode, you're more putting things off, more complacent. With a satellite program, you know you have a specific date to target and you schedule your study habits around that."

Two interview participants indicated that they either perceived no benefit to synchronous interaction, or felt that the scheduling restrictions of attending a synchronous training event presented serious logistical drawbacks. Their comments were:

- "Satellite was a waste of time. We could have read everything in the satellite session guide. They should have just sent out the satellite session guide. It was very straight forward."
- "I was ill last Thursday so I missed the second of the three broadcasts. Generally scheduling is not a problem because you could trade with people in your branch. But they are cramming so many sessions so quickly that if you miss one there is little opportunity to reschedule yourself. I will also be at a meeting for the third session, so I won't be able to do that one either."

Learners' Perceptions of Each Type of Interaction and How These Are Related to Learner Satisfaction in Satellite Training

I found that virtually all of the interview participants had a very high degree of awareness of themselves as learners. They seemed very perceptive of the various interaction techniques employed in the satellite training sessions and most were very astute in articulating their "likes" and "dislikes" with respect to this learning experience. Learners' perceptions collected in the qualitative data were then compared to quantitative data gathered through learner reaction evaluations and interaction analysis to identify patterns that might provide insight to this research question. It is important to note that "learner satisfaction" in the *quantitative* data was defined as the percentage of learners who assigned an overall rating of "good" or "excellent" to a satellite training session on reaction evaluations collected by *Learning & Development* department. Learners who rated sessions as "poor" or "fair" were assumed to be "dissatisfied" with the satellite training experience.

During the interviews, learners were asked to compare their satellite experiences to other forms of corporate training. In general, most interviewees found interaction in satellite-based

training to be less satisfactory than classroom-based instruction, but more appealing than print-based self-study. Compared to classroom-based training, many learners reported that they found interaction in satellite training to be "more formal," "less dynamic," "less engaging," and "less intimate." However, two interview participants stated that they found interaction in satellite training to be less intimidating than "sitting in front of the instructor."

When asked how they felt about participating in future satellite sessions, all interview participants gave the same pragmatic response. Regardless of how they felt about satellite training in terms of learner satisfaction, they *all* indicated they would be willing to attend future satellite training if this proved to be the only way they could obtain the skills and knowledge needed to perform their jobs.

Beyond these general observations, learners' perceptions differed significantly with respect to the four different types of interaction. These perceptions are described in the next section.

Learner-Interface Interaction

Findings describing learners' perceptions of learner-interface interaction are reported as they relate to:

- Instructional time spent in interaction;
- Benefits of satellite;
- Learner experience with the satellite learning medium;
- Confidence in using the technology;
- Trialability;
- Technical problems;
- Learning environment;

- Distraction created by the technology; and
- Visual reinforcement.

Instructional time spent in interaction. Quantitative data describing the relationship between learner-interface interaction and learner satisfaction is summarized in Table 6. As Table 6 shows, satellite sessions that spent less instructional time in learner-interface interaction, as defined in this study, were rated higher in terms of learner satisfaction. For example, satellite sessions #1 and #5 spent the smallest percentage of time in learner-interface activities (16.5% and 14.3% respectively) and were rated highest for overall learner satisfaction (86% and 90% respectively). These findings suggest a negative relationship between learner satisfaction and the percentage of time learners spend attending to and interacting with the instructional technology.

Benefits of satellite. Interview participants were asked to identify reasons why they thought the Bank was using satellite technology to deliver training. All participants were able to identify a number of reasons without any difficulty:

- "… reaches diverse people in diverse settings."
- "The bank is able to reach almost 900 people in one day – with only two trainers."
- "It ensures that everyone is on the same wave length."
- "It is cheaper and easier than setting up classes in cities across Ontario."
- "It's an efficient mode of learning from a corporate stand point. It captures a lot of people at once."
- "Because it's cheap."

Table 6. Learner-Interface Interaction

Program Characteristics	Satellite Session #1	Satellite Session # 2*	Satellite Session #3*	Satellite Session 4*	Satellite Session 5
Learner Satisfaction					
% of learners who gave the satellite learning experience an overall rating of "good" or "excellent"	86%	78%	73%	57%	90%
% of time spent in Learner-Interface interaction (codes 1 & 2)	16.5%	23%	24.5%	23.4%	14.3%
Learner Experience					
Did the majority of learners participate in at least 4 previous satellite learning sessions?	Yes	Mixed	Mixed	Mixed	No
% of time spent listening to instructions, protocols related to the technology (code 1)	12.4%	12.4%	13.6%	11.5%	8.2%
% of time spent using handsets to respond to questions (code 2)	4.1%	10.6%	10.9%	11.9%	6.1%
Technology					
% of learners who responded "Yes" on reaction evaluations to the question: "I am comfortable using satellite technology to voice my opinion and/or respond to questions on air."	Not available**	60%	59%	58%	71%
% of learners who responded "Yes" on reaction evaluations to the question: "I am comfortable using the handset to enter my responses to questions asked."	Not available**	92%	91%	80%	90%
Technical Problems:					
% of time instructors spent dealing with technology failure during broadcast (code 0)	.3%	1.9%	1.2%	2.9%	2.1%
Ratio of time spent in Learner-Interface interaction to Learner-Content interaction	1: 3.2	1: 1.1	1: .87	1: 1.4	1: 1.6

* These satellite sessions were the subject of the interviews describing learners' experiences.

** This program was being offered to learners who were experienced with the satellite medium; therefore, questions about their comfort level with the technology were not asked.

Interview participants were then asked to identify personal benefits of attending satellite training versus attending conventional classroom training. Two participants responded that there were no benefits to attending satellite training. The following comments were representative of the types of personal benefits learners associated with satellite training versus classroom:

- "It was more convenient. Logistically, we just went to the branch that was closest to us. We didn't' have to drive to Burlington or Toronto."
- "You were still in your region and you could sit with your peers."
- "Less time – you don't have to be away from your desk for half a day or a whole day like going on a course."

Learner experience with the satellite learning medium. The literature suggests that there is a relationship between learners' experience with a distance training technology and their need for learner-interface interaction. It is assumed that learners who are less experienced with the technology have a higher need for learner-interface interaction. To investigate this assumption, data were gathered from satellite sessions and interview participants so as to ensure a maximum variation in the level of learner experience. Learners' experience with satellite-based learning ranged from attending two satellite sessions to attending approximately 20 sessions. Pre-merger Bank heritage employees, or "Green" learners, had the most experience with satellite-based training, attending an average of seven different training sessions. Trust Company heritage employees, or "Red" learners, had the least experience with satellite, usually limited to three or four sessions. As Table 6 shows, satellite session #1 was the only training broadcast in which the majority of learners had attended more than four satellite training sessions in the past. Session #5 was delivered to a relatively

inexperienced learner audience (i.e., the majority had attended four or fewer satellite sessions). Satellite sessions #2, #3 and #4 were delivered to mixed audiences of Red and Green learners, suggesting a mix of experienced and inexperienced learners.

The quantitative findings do not support a relationship between learners' level of experience with the satellite medium and their need for the learner-interface interaction, as defined in this study. For example, satellite session #5 was delivered to inexperienced learners but showed the least amount of time spent on learner-interface interaction activities. However, the relatively less time spent by instructors in explaining protocol and handset use did not appear to have a negative impact on learners' self-reported ability to use the technology in responding to "electronic" or "call-in" questions/comments. In fact, satellite session #5 learners reported the highest level of "comfort" in using the satellite technology for interaction. These quantitative data were consistent with both Red and Green learner comments that indicated that the satellite technology was easy to use and that learning protocols were well understood, regardless of the learner's previous experience with the satellite medium:

- "It [handset instructions] was written on the sheet, but at the beginning, the instructor also went over with us what the objectives were of the course…and what would be expected of us. There was nothing that was shocking or took me unaware." (Red)
- "We were told everything during the satellite broadcast…even people who were there for the first time had no problem using the equipment." (Red)
- "I had gone through it [satellite training] before so there was no big surprise." (Green)
- "After you've done one [satellite session] you're pretty familiar with the technology. It's a breeze." (Red)

- "Not a problem at all. The way the session is organized and formatted, participating was no problem. One simply needs to pay attention to the host. It makes for a very pleasant learning experience." (Red)
- "The whole technology thing was very well addressed. Instructors make it very clear." (Green)
- "The system was very user friendly." (Green)

Confidence in using the technology. Learners in the four satellite sessions for which such data were collected indicated a high level of comfort in using the handsets to respond to electronic questions, 80% to 92% felt comfortable using the technology for this purpose.

Similar results were *not* reported for comfort level in using the handsets to call in to the studio and "voice an opinion or respond to questions on air." For example, in satellite session #4, only 58% of the "mixed experience" learner population reported that they felt comfortable using the handsets for this type of communication. However, among the relatively inexperienced learner audience of satellite session #5, 71% of participants reported that they were comfortable using the handsets to call in.

Comments made by learners suggested a general reluctance to engage in call-in communication using the handsets:

- "No, I didn't call in, but it looked pretty easy."
- "A lot of people had issues with calling in."
- "I didn't call in because I'm not sure how the phone system works. Once I push that button, what's going to happen after that? It's intimidating."

Satellite session #3 showed the greatest amount of time spent on learner-interface interaction; however, 40% of learners still indicated that they did *not* feel comfortable using

satellite technology to "voice an opinion or respond to questions on air." These findings suggest that factors, in addition to technical know-how, are impacting learners' motivation to engage in this type of interaction.

Trialability. Some learners commented that they appreciated the flexibility that satellite training afforded them to participate in whatever way and to whatever degree they felt comfortable. One important and recurring theme that emerged from the qualitative data was learners' perception that *all* forms of interaction in satellite training were voluntary and self-directed. The following comments illustrate this perception:

- "Satellite gives people a lot of options to participate in different ways depending on their comfort level."
- "Everyone sits and does their own thing."
- "That's one of the problems in satellite training. You might not be paying attention and no one is going to know except the people at the site. But no one is holding anybody accountable."
- "Everyone volunteered and the group spokesperson role rotated."
- "You could participate as much or as little as you want."

Technical problems. Interview participants reported that technical problems that resulted in the loss of communication between the studio and the site(s) were "distracting" and detracted from the overall appeal of the satellite learning experience:

- "At our site it was fine, but I know it was a hassle for some people who were experiencing technical difficulties, because they've all spent their time and weren't getting the benefit. It was very distracting and frustrating."

- "Some sites had some difficulty. One site was finally able to tune in to the broadcast about 20 minutes late. They did call in and express their frustration to the people conducting the satellite training. It was all very distracting and really unfocused people."
- "Yeah, in most of the sessions someone can't be heard, or they pressed the wrong buttons. It's quite distracting – gets the whole room laughing."
- "Some sites were having problems getting through. The instructor explained that the problems were because of a storm. They flashed a number on the screen and asked those sites to call the number. It wasn't a big deal so that was fine."

The quantitative data did not show a conclusive relationship between the degree of technical problems experienced in a satellite broadcast and learners' overall satisfaction with the training. For example, satellite session #4 showed the highest occurrence of technical problems, with 2.9% of instructional time spent dealing with incidents of technology failure. This session was also rated the lowest in terms of learner satisfaction (57%). However, satellite session #5 had the second highest occurrence of technical problems (2.1% of time) but was still rated the highest in terms of learner satisfaction (90%). These findings suggest that while technical problems might potentially detracted from the appeal of satellite training, other factors, such as the instructor ability and composure in handling the technical problem, may serve to mitigate their impact.

Learning environment. Learners' comments clearly indicated that they had a broader perception of learner-interface interaction than the construct that is prevalent in the literature and being applied in this study. From their perspective, interacting with satellite technology went beyond interacting with the technology itself (which for most people represented a relatively minor issue) to encompass interaction with the *total* learning environment. As

these comments illustrate, learner satisfaction with satellite training was influenced by their perceptions of the physical training environment. The location of the receiving site, the size of the room relative to the number of trainees, the positioning of equipment, the perceived lack of amenities, and the manner in which learners were "greeted," all had an impact on their overall attitudes towards the satellite training experience:

- "We were in a large boardroom with chairs all around a large table. There were about twelve of us and it was a good sized room for the group."
- "The room was definitely a problem. It was too small. There were eight people at the site all seated around one small table, elbow to elbow. With our binders, and all the telephone units it was just too cramped."
- "It [the room] was very small and cramped. There were about 10 of us in there. In another session there weren't enough log-in units [handsets]. Some people didn't have units."
- "There was no one really administering it. You just had to do it yourself. I was surprised to find that."
- "The site was absolutely inadequate for it. It was a tiny room, about the size of someone's office, with a conference table about the size of a kitchen table. There were eight chairs around it. You could hardly pull your chair out to sit."
- "It was a very confined area. The door had to be closed because the branch was noisy so it got rather stuffy in there. You can't even cough without breathing on someone."
- "There was only room for eight but nine people showed up. So, one person had to stand for two hours."

- "The monitor was in a corner and the way the table was set up, a lot of us had our backs to the TV monitor. We had to turn to watch the screen and we were blocking other people's view. Try that for two hours!"
- "The manager was there to greet us as we arrived. I was surprised and impressed to find that."
- "It was not clear to me who was responsible for setting up the site. Everything was done and put out before we got there. No one appeared to be in charge."
- "It wasn't a comfortable room to be in for that length of time. I just expected something like *Encounters* where they had coffee and handouts [small promotional "give away" items]. It wasn't what I expected at all for something that is this important. It should be a comfortable experience at least."
- "The boardroom was set up in a U-shape. It was very comfortable and appropriate for training."
- "The training room was in the basement of a branch…not what I expected at all."

Eleven of the 19 interview participants reported that there was no one to greet them upon their arrival at the site.

In the interviews, it was found that learners who described their physical learning environment as "good" or "very good" tended to perceive their overall satellite training experience in more a positive light.

Distraction created by the technology. In this study, the amount of distraction that is created by the satellite medium itself is assumed to be a function of how much instructional time is devoted to listening to instructions about the technology, and using the technology (learner-interface interaction), versus the amount of time spent focusing on the subject matter

content (learner-content interaction). Satellite session # 1 had the lowest ratio of learner-interface interaction to learner-content interaction. In other words, 3.2 times more instructional broadcast time was spent on the content than on the satellite technology itself. As the data shows, learners gave this session a relatively high satisfaction rating (86%). Conversely, satellite session # 4 had the highest ratio of time spent on the technology versus the content. In other words, only 87% of the time spent on explaining and using the technology was spent on the subject matter content. Learners rated this session lowest in overall satisfaction rating (57%). The pattern emerging from this quantitative data indicated that satellite sessions with lower learner-interface to learner-content ratios (e.g., satellite sessions # 1 and #5) were rated higher in terms of overall learner satisfaction. These findings suggest a relationship between low learner-interface to learner-content ratios and learner satisfaction.

Visual reinforcement. Interview participants reported that the use of visuals such as PowerPoint slides enhanced the quality of their satellite learning experience. In addition to the visual reinforcement of the spoken message, the slides were perceived as a valuable change element that helped retain learners' attention. The following comments illustrate the value learners ascribe to this aspect of learner-interface interaction:

- "They [the PowerPoint slides] were a nice diversion. They showed us a few bar graphs that helped us see why they chose this [portfolio management] strategy."
- "The slides of bullet points had value."
- "The slides were a good summary of what the instructors were saying."
- "It's important to have those bullet point slides to let you know where you are in the program so you can follow along in your own package."

- "The visuals were very helpful. It gives us a good mix and draws away from the monotony of two people talking."
- "The slides break things up a bit. They help keep your attention rather than watching two people on the screen."
- "They (the slides) are essential. I'm a visual person, if I can visualize something, I can grasp the concept a lot easier."
- "That's a very important part of the presentation for me. Without them [the slides], my mind wanders."

Learner-Content Interaction

Learner perceptions of learner-content interaction are reported here as they relate to:

- Instructional time spent in interaction;
- Type of training application;
- The message;
- Presenters and presentation format;
- Newness of information'
- Precourse work; and
- Printed satellite session guides.

Instructional time spent in interaction. Quantitative data describing the relationship between learner-content interaction and learner satisfaction were summarized in Table 7. As Table 7 shows, satellite session # 5 had the highest percentage of time spent in learner-content interaction (52.4%) and was rated second highest in terms of learner satisfaction (86%). Conversely, satellite session #5 was rated highest in terms of learner satisfaction (90%) but showed less time spent in learner-content interaction.

Table 7. Learner-Content Interaction

Program Characteristics	Satellite Session #1	Satellite Session # 2*	Satellite Session #3*	Satellite Session 4*	Satellite Session 5
Learner Satisfaction					
% of learners who gave the satellite learning experience an overall rating of "good" or "excellent"	86%	78%	73%	57%	90%
% of total time spent in Learner-Content interaction (codes 3 and 4)	52.4%	25.3%	21.3%	33.3%	23.6%
Type of training application	Information Dissemination and Knowledge Building	Critical Thinking and Building Technical Skills	Critical Thinking and Building Technical Skills	Critical Thinking and Building Technical Skills	Attitude Change and Motivation Enhancement
Number of presenters	4 – host/instructor and 3 subject matter experts	2 – instructors	2 – instructors	2 – instructors**	2 – host/instructor and subject matter expert
Presentation format	Exert Interview	Lecture	Lecture	Lecture	Expert Interview
Type and amount of precourse work	No prework	Self-study guide 1 ½ - 2 hours prework	Self-study guide 1 ½ -2 hrs prework	Self-study guide 4 – 5 hrs prework	Brochure 15 min prework

* These satellite sessions were the subject of the interviews describing learners' experiences.

** Instructors were joined by two subject matter experts but only for the last 10 minutes of the broadcast

(23.6%) than, for example, session #4 which received the lowest satisfaction rating. Therefore, the quantitative these findings are inconclusive in suggesting a relationship between the percentage of instructional time spent in learner-content interaction and learner satisfaction.

Type of training application. Satellite session #1 is an example of the type of training application that is best described as "information dissemination," in which learning objectives pertain to the cognitive domain of "knowledge building." Satellite session #5, on the other hand, is an example of a training application that is intended to change attitudes; the objectives of this session apply to the "affective" domain. The relationship between learner-content interaction and learner satisfaction, as reported in the findings in Table 7, suggests that learners may equate higher levels of learner-content interaction in "information dissemination and knowledge building" with higher levels of satisfaction with the training. Conversely, learner-content interaction may be regarded as less important in affective training that is aimed at changing attitudes and perspectives.

The message. Some learners reported that they found it difficult to separate their perceptions about satisfaction with the satellite training session from their personal feelings about the message communicated in the instructional content. Learners who had doubts about the message conveyed in the training, or perceived it to have a potentially negative impact on their work routine, were less likely to find value in the content of the training. The following comments illustrate this finding:

- "You can't separate the course from the message. People were having some problems with the message – how feasible is it to introduce the FA [Financial Advisor] right now when we have the mess of the merger to deal with?"

- "People were feeling 'I don't want a portfolio right now – I can hardly get the work I have done'."
- "I can see where the bank is going with this strategy, but the sentiment from people in the sessions was where are we going to find the time to do this?"

Presenters and presentation format. Satellite sessions #1 and #5, both of which utilized the "expert interview" format were rated more favourably in terms of learner satisfaction than sessions that were presented through the lecture format. Likewise, sessions that were delivered through a combination of instructors and subject matter experts were rated higher than sessions that were delivered by instructors only.

Comments gathered in the interviews indicated that learners value a variation of styles and techniques in content presentation (e.g., videos, role plays) and that the credibility of the presenter is an important consideration for them:

- "Videos of FAs [Financial Advisors] were helpful. It was good to hear from people going through the same thing."
- "The videos were a nice addition. Those are real individuals, some of them I know personally. Hearing their feedback is reality."
- "Videos added to the interest level. People like to hear from one's peers."
- "At one point in the program the instructors did a role play of a good and bad example of calling a customer. That helped maintain my interest."

"Newness" of information. Comments gathered through learner interviews suggested that learners' satisfaction in a satellite training session is directly related to their perceptions about the "newness of information" conveyed in the instructional content. For example, Red employees who were unfamiliar with the information about work processes described in

satellite sessions were more motivated to participate in the training than Green employees who were already familiar with this information:

- "A lot of the training was very helpful – especially from the CT side which didn't have portfolio management experience. I'd say about 90% of it was helpful." (Red)
- "A great deal of it was relevant." (Red)
- "I have 13 years experience as a Manager Sales and Service. I can tell you that everything they taught us was valuable." (Red).
- "The first training session was the largest – 15 people. By the third session, today, it dwindled down to four people – all Red. Once the Green heritage people realized the course content was repetitive for them they reprioritized – taking their customers' appointments instead. The Red people continued to come." (Red)
- "It was a bit of a repeat. I could probably have not gone." (Green)
- "It was somewhat valuable. A bit repetitive. I've been an FA [Financial Advisor] for a year." (Green)
- "Not much value there. I didn't learn anything new." (Green)

Precourse work. Newness of information was not simply determined by job experience. Precourse work is another variable that impacts learners' perceptions of the newness – and therefore the value – of information conveyed through the satellite session. Satellite sessions #1 and #5, which were preceded by little or no precourse work, were rated higher in terms of learner satisfaction than training that included significant amounts of precourse work. Satellite session #4, which was preceded by the greatest amount of precourse work (4 to 5 hours of reading and assignments) was rated the lowest in learner satisfaction. These findings suggest a negative relationship between the amount of precourse work and the overall appeal

of satellite training. As the following comment illustrates, even Red learners who had completed the precourse work found less value in attending the satellite training events:

- "All of the content was in the pre-reading binder. The course was just a reiteration of the binder. I didn't find a lot of extra value from the satellite. I could have used my time more productively at the branch." (Red)
- "It [the satellite training] was not crucial because we had the reading material. Satellite basically reviewed what was in the book." (Red)

Printed satellite session guides. Several learners commented on the value of receiving a satellite session guide. They perceived these materials as important for allowing them to follow along in the presentation and as post-training reference tools. Several learners reported that they felt no need to take notes during the session since the guides were so comprehensive. One learner indicated that the session guide provided sufficient information and that there was little value in attending the satellite session itself. The following comments illustrate these perceptions:

- "The handout package was good. It pretty much followed the presentation so I didn't need to take a lot of notes."
- "I prefer to have everything in one package rather than taking notes on a piece of paper here and there. That way everything can be organized and stored in the training binder. "
- "I didn't need to take very many notes. The guide had all the information."
- "Satellite was a waste of time. We could have read everything in the satellite session guide. They should have just sent out the session guide."

Learner-Instructor Interaction

Learner perceptions of learner-instructor interaction are reported here as they relate to:

- Instructional time spent in interaction;
- Relating with the instructor;
- Instructor credibility;
- Instructor performance and delivery style;
- Electronic questions and feedback;
- Instructor talk and type of training application;
- Learners' names; and
- Games and prizes.

Instructional time spent in interaction. Quantitative data describing the relationship between learner-instructor interaction and learner satisfaction were summarized in Table 8. As Table 8 shows, satellite session #1 spent the smallest percentage of time in learner-instructor interaction (13.1%) but was rated very high in terms of learner satisfaction (86%). Conversely, satellite session #3, which spent the most time in learner-instructor interaction (29.8%), was rated relatively lower in terms of satisfaction (73%). Satellite sessions #4 and #5 spent about the same amount of time in this type of interaction but were rated very differently in terms of learner satisfaction. These findings suggest that the relationship between learner-instructor interaction and learner satisfaction is not merely a function of instructional time, but rather is impacted by other factors such instructor skills and performance and the type of training application, to name a few.

Relating with the instructor. Learner comments indicated that they found relating with the instructor through the satellite medium to be the least satisfactory dimension of their experience as distance learners. Learners didn't feel that they "knew" the satellite instructors

Table 8. Learner-Instructor Interaction

Program Characteristics	Satellite Session #1	Satellite Session # 2*	Satellite Session #3*	Satellite Session 4*	Satellite Session 5
Learner Satisfaction					
% of learners who gave the satellite learning experience an overall rating of "good" or "excellent"	86%	78%	73%	57%	90%
% of total time spent in Learner-Instructor interaction (codes 5, 6 and 7)	13.1%	28.5%	29.8%	23.1%	22.5%
Number of electronic questions asked	12	16**	10**	9**	16
% of total time spent attending to instructor talk (codes 1, 3, 5 and 6)	77.9%	64.7%	64.7%	66.3%	52.9%
Type of training application	Information dissemination and knowledge building	Critical thinking and building technical skills	Critical thinking and building technical skills	Critical thinking and building technical skills	Attitude change and motivation enhancement
Instructor's overall performance was effective and helped me to learn	97%	73%	67%	62%	88%

* These satellite sessions were the subject of the interviews describing learners' experiences.

** Excluding "reaction evaluation" questions which were not related to instructional content.

When asked, none of the interviewees could provide very much information about the instructors' background, professional experience or even whether or not they were employees of the Bank. Some assumed that the instructors were external training professionals who were contracted to deliver the satellite broadcast.

Many interviewees stated that the lack of "eye contact" was a disadvantage in relating with the instructor because it detracted from the sense of presence they had of the instructor. Some learners stated that they missed the "personal one-on-one contact" with a "live" instructor that they experienced in a classroom setting. The following comments are representative of these perceptions:

- "Because it is from a distance it was difficult to tell anything personal about the person."
- "It was very different from a classroom situation where you feel like the person is 'there more' – that there is a human connection."
- "When the instructor is doing it over the television – or satellite training – you don't actually see the person and that person is not seeing you."
- "There isn't that 'bond', for lack of a better word, when you can't make eye contact with someone."
- "Over the television screen, it's just like seeing someone on television – like a reporter or something. You see the person, you think you know the person, but it just isn't there."
- "It was hard to focus when the instructors weren't actually in the same room. It felt a lot like TV."
- "They're not really speaking to you."
- "I know nothing about the instructors. I don't know where they came from or if they even work for the bank as opposed to a training company."

- "I didn't feel like I knew them at all. Not at all."

Instructor credibility. In the absence of specific information about instructors' backgrounds and job experience, many interviewees communicated the impression that the satellite instructors *could not relate* to learners and their experiences in the branches. This was essentially perceived as a lack of credibility on the part of instructors:

- "It would help to know a little bit about them [the instructors]. It would give them more credibility to know that they know what goes on in a branch and that they're not just head office people telling us what we should be doing."
- "I thought 'wow' these people [the instructors] are very isolated from us because they are not seeing how things are done."
- "When we're in a live environment, people who roll out the training to us are people who are very familiar to us. We can empathize with them a little more. They'd say 'you know guys this going to work because I've been in your shoes and it worked' or 'these are the obstacles you may encounter'."
- "The first group [of instructors] just said that they were with *Learning & Development.* They didn't actually go into credentials to say what they did."
- "I assumed that the instructors on air had either never worked in a branch or it's been a long time since they've been there."
- "It would help to know what their expertise is – what their competence level is. You want to know who is speaking to us – that it is someone one who has the background and knows where we are coming from too."
- "They seemed knowledgeable but there were a couple of 'hands on' questions they wouldn't know unless they were physically working in a branch and dealing with

customers…I'm not sure if they were hired to instruct or if they had a role in the roll out of this strategy."

Instructor performance and delivery style. The instructor's personal delivery style, as defined by their demonstration of personal qualities, skills and competencies, significantly influenced learners' perceptions and overall satisfaction with satellite training. As Table 8 shows, satellite sessions that were rated highest in terms of "instructor's overall performance" were also rated highest in learner satisfaction. These quantitative findings showed a direct relationship between learners' perception of instructor performance and learner satisfaction.

Findings in the qualitative data also supported a relationship between instructor performance and learner satisfaction. Learners reported more favourable impressions of satellite training when they described the instructor(s) as " a good communicator," "very knowledgeable," charismatic," "excited about what they are teaching," have a "sense of humour" and "enthusiastic." Voice quality appeared to be particularly important to learners who had negative perceptions of sessions in which the instructor spoke in a "boring" or "monotone" manner.

Although many individuals commented that they found interacting with the satellite instructor to be "impersonal," "formal" and "mechanical" many were quick to add that they did not regard this as a lack of competence on the part of the instructors but rather a limitation of the satellite medium itself. Learners perceived that the protocols imposed by the satellite technology resulted in an instructional delivery style that was more mechanical, more scripted, less spontaneous, less "fun" and ultimately less "interesting." A reoccurring theme in learners' comments was that they saw a parallel between satellite training and the

television medium in terms of formality of delivery style and impersonal connection between presenters and viewers. The following comments illustrate these learner perceptions:

- "There is a level of formality there."
- "They did not seem as natural as a classroom instructor."
- "A classroom instructor can make it more fun and interesting."
- "The instruction falls short. It's too mechanical – like the instructors aren't really there."
- "They tend to be like TV personalities, just reading stuff."
- "They're polite and follow a strict program session that has been laid out for them."
- "It's not the same as a classroom environment where the teacher may deviate a little and inject a little of their own experience."
- "It looks like the instructors are reading scripts and I think they *are* in the TV session – that's why I don't find it interesting."
- "They seemed to be enjoying what they were doing. They had a good rapport."
- "The gentleman seemed to have a lot of positive energy."
- "They were very enjoyable and easy to listen to."
- "They seemed relaxed enough that there was a comfort level there. They would quip back and forth a little bit which was important, otherwise it would have been far too dry."
- "I don't want to knock them [the instructors] down too much. It is a very formal setting – there are a lot of people watching them. There is a certain professionalism or protocol that they need to meet."
- "They did a good job. It's a little bit boring and hard to pay attention but not because of their efforts."

Electronic questions and feedback. Satellite session #5 had among the highest number of

electronic questions (16) and was rated highest in terms of learner satisfaction, suggesting a relationship between the frequency of electronic questions and learner satisfaction. These quantitative findings were supported by qualitative data. For example, during the interviews all of the learners reported 100% response rates to electronic questions for themselves and others at their site. Learners perceived electronic questions to be valuable for a number of reasons which included maintaining attention and participation. When combined with the instructor's feedback and debrief of the correct response, the questions were reported to be a good form of a "learning check." These learner perceptions are illustrated in the following comments:

- "I responded to every question, even though I didn't really need to."
- "Everyone at our site responded to all of the questions – even if there was chit chat going on throughout the presentation. This was the time they focused on the learning task."
- "I answered those questions 100% of the time – everyone did. You didn't have to talk so it was a good way for everyone to participate."
- "Those [questions] were fun. That keeps everyone paying attention. Sure, I answered those. Everyone in the room did."
- "They [the questions] were good for participation and keeping me focused. I'd say they definitely made you participate and …kept you interested in what you're doing"
- "Yes, I think the questions are important. They test your knowledge rather than just watching the TV. They get you involved – let you know where you are on the learning path."
- "I find that the only thing that tends to keep me awake is answering those questions."

- "As a matter of getting people moving and paying attention, they [the questions] were very effective."
- "Getting the feedback bar graphs was really important. It was very interesting to see how different people had responded to the questions. Sometimes the scores really varied."
- "I think it helps people to give thought to what they've learned and it gives them an idea of how well they know the material."

Instructor talk and type of training application. Learners in satellite session #1 spent the highest percentage of time (77.9%) attending to "instructor talk" (i.e., interaction codes 1, 3, 5, and 6). However, this relatively passive mode of learning did not appear to detract from the overall experience of satellite training since learners rated this session high in terms of satisfaction. Conversely, satellite session #5, which shows a relatively low level of instructor talk (52.9%), is also related to a high learner satisfaction rating (90%). This finding suggested that the *type* of training application had an impact on the amount of instructor talk learners will tolerate during satellite training. For example, in training that is concerned with information dissemination and knowledge building (e.g., satellite session #1), learners may tolerate, and in fact *expect*, a higher level of instructor talk. Whereas in affective programs aimed at attitudinal change, learners are satisfied with a lower level of instructor talk. It should be noted that these findings are also consistent with the relationship between "type of training application" and learner-content interaction, cited earlier (see Learner-Content Interaction).

Learners' names. A few learners commented on the instructors' practice of using learner names whenever possible during "call-ins." Those that did remark on this practice, indicated that they found it to be intimidating. Their perception was that being identified, even if only

on a first name basis, put them at "risk" of being "recognized" by others during "call-in" communication with the instructor:

- "I think that people might call in more if they don't have to identify themselves."
- "Some people won't call in because they might think that there are people out there who might recognize them. What if they have a dumb question or get the answer wrong?"
- "People don't want to be recognized as 'Sue from Oakville'."

Games and prizes. Interviewee comments indicated that learners found "games" and "prizes" to be effective motivators for increasing engagement and interactivity. Learners reported an increased likelihood to call in and respond to questions if there were small prizes offered as incentives:

- "Everyone likes prizes."
- "They were giving prizes away. That always helps to speed things up!

Learner-Learner Interaction

Learner perceptions of learner-learner interaction are reported as they relate to:

- Instructional time spent in interaction ;
- Type of training application;
- Group dynamics at the site;
- Feeling "connected";
- "Side-talk";
- Small group discussions;
- "Call-ins";
- Listening to peers' questions and comments; and
- Audience size.

Instructional time spent in interaction. Quantitative data describing the relationship between learner-learner interaction and learner satisfaction were summarized in Table 9. As Table 9 shows, satellite session # 5 had the greatest percentage of time spent on learner-learner interaction (37.4%) and this was also the highest rated session in terms of learner satisfaction (90%). However, satellite session #4 had only marginally less time spent in learner-learner interaction but was rated significantly lower in learner satisfaction. These findings are inconclusive in showing a relationship between learner satisfaction and instructional time spent in learner-learner interaction, suggesting that other factors may impact the relationship between learner satisfaction and this type of interaction.

Type of training application. Although the quantitative data are inconclusive in identifying a direct relationship between learner-learner interaction and learner satisfaction, the available evidence does suggest that learner-learner interaction may be more important in affective training applications aimed at changing learners' attitudes, and relatively less important for training applications concerned with knowledge dissemination. For example, in satellite session #5, the higher percentage of time spent in learner-learner interaction (37.4%) is related to a higher learner satisfaction rating (90%). Similarly, the relatively smaller percentage of time spent in this type of interaction in satellite session #1 (17.7%), which is concerned with knowledge dissemination, is *also* related to a higher learner satisfaction rating (86%).

Table 9. Learner-Learner Interaction

Program Characteristics	Satellite Session #1	Satellite Session # 2*	Satellite Session #3*	Satellite Session 4*	Satellite Session 5
Learner Satisfaction					
% of learners who gave the satellite learning experience an overall rating of "good" or "excellent"	86%	78%	73%	57%	90%
% of total time spent in Learner-Learner interaction (codes 8, 9, 10 and 11)	17.7%	21.4%	23.2%	17.3%	37.4%
Type of training application	Information dissemination and knowledge building	Critical thinking and building technical skills	Critical thinking and building technical skills	Critical thinking and building technical skills	Attitude change and motivation enhancement
Number of face-to-face group discussion exercises at receive site	1	2	4	3	3
Total number of calls by learners	22	22	21	15	34
Total number of "call-in" questions	12	0	0	1	14
% of time spent engaging interaction through the satellite medium (codes 8 & 9)	12.1%	9.2%	9.3%	6.6%	15.8%
% of time spent in face-to-face interaction (codes 10 & 11)	5.6%	12.2%	13.9%	10.7%	21.7%
% of time spent in unstructured interaction (i.e. breaks)	.3%	0	0	0	7%
Audience size (i.e. number of participants logged in to session)	310	173	210	115	200

* These satellite sessions were the subject of the interviews describing learners' experiences.

Group dynamics at the site. In interview comments, learners reported feeling more "comfortable" in satellite sessions where they were already somewhat familiar with other individuals at the site. However, they reported little opportunity during the satellite training and little inclination on the part of learners to get to know new people at the site. These perceptions are reflected in the following comments:

- "I already knew most of the people in the room. A few of them I didn't know so we just briefly introduced each other."
- "I knew about half the people from other courses. This makes it more comfortable when it came to working in a small group setting."
- "I didn't know too many people there. There wasn't sufficient opportunity to get to know others at the site."
- "Some of them I already knew. Otherwise you only get to know the person sitting beside you."
- "You tend to flock to people you already know. So you don't meet a lot of new people."
- "It would be better if people were encouraged to change groups so that they could get to know more people at their site. Groups tended to be the same ones each session."
- "The ones that I didn't know, I didn't get to know."
- "I knew some people going in. I didn't really focus on the others. I didn't interact a lot with others in there – mostly just the people I already knew."

Some learners identified the initial minutes after arrival at the site as the most awkward time in terms of group dynamics, reporting that some groups found it difficult to "break the ice" without the assistance of an onsite facilitator.

- "There were small groups of people talking to each other. One person was reading the paper, some people were just sitting there. I basically said 'hi' to everyone and just sat down."

Feeling "connected". Most interview participants indicated that they considered it important to feel that they are connecting with others when they attend training events. They regarded interaction with other learners to be an important dimension of learning and they cited networking as having professional as well as personal benefits. Many learners reported that they felt more comfortable knowing that others at the site shared their experiences and concerns. These perceptions are illustrated in the following comments:

- "Interbranch banking is so important these days that it helps to know who people at other branches are so you can call them up and ask them about a customer problem or issue."
- "I think you want to be able to talk to people who are in the same boat as you."
- "Feeling connected with others is important. It's like any other social event. You don't want to be in a situation where you don't have anyone to hang out with."
- "Indeed, it [feeling connected with others] is important because we are in the same role and we can learn from each other."
- "Knowing that you're not alone, overwhelmed, stressed on your job – you get comfort from people in the room. It's like you're not alone out there. It's not just your branch going through this."
- "I think you learn in an environment where you feel comfortable and if you can connect with people it will add to your learning experience."
- "It's like a networking thing – if you connect with others you have sources of information."

- "I see a huge benefit in connecting with others."
- "I think any time you're involved in any type of learning experience, it's nice to feel you have common ground with others there – rather than being stuck in a room full of strangers."

Many learners commented that they did not perceive sufficient opportunity in their satellite training experience to get to know and connect with others, especially in satellite sessions that did not include some unstructured break time. As Table 9 shows, satellite sessions #5 which had the greatest percentage of time spent in unstructured breaks was also rated highest in terms of learner satisfaction. The following comments express learners' concerns about the lack of opportunity to connect with others at the site:

- "At the beginning of training sessions we would do 'meet and mingle' types of activities to make people comfortable. In satellite you never really let your guard down."
- "There was no time for getting to know people at the site."
- "There wasn't really a break time when you could interact."
- " The first people to arrive at the site got logged on and basically sat and waited for the session to start. There wasn't a lot of communication – just basically 'did you read the material?'"
- "There's not a lot of time to get to know people in a large group. In smaller groups you get to know them better."
- "There's not sufficient time to get to know people. We started right at 9:00 – you don't really get an opportunity to connect before the session. After the session people are rushing away to get back to their office."

Not all interviewees expressed a need to feel connected with their peers during satellite training:

- "I just want it to be friendly and professional. It doesn't really matter to most of us if we work as a cohesive group. We know that we're only going to be there for two hours – we want to fulfil what's expected and get back to our jobs."
- "There's an up side and a down side to networking – if they know people too well it becomes a venting session."

"Side-talk". A recurrent theme that emerged through interview comments was that group dynamics at some of the sites presented a barrier to attending to the instructional broadcast. In some cases the level of "side-talk" among people at the site made it difficult to hear the instructor(s) speaking. Some learners reported that their peers were "distracted and distracting," especially in situations where Green employees were already familiar with the training content and therefore uninterested. Many participants suggested that the amount of "side-talk" occurring at the sites was a reflection of the amount of organizational change being experienced by employees. Others identified the problem stemming from a lack of "learner protocol" and the absence of an onsite facilitator, noting that "side-talk" was less of a problem at sites where managers were in attendance at the training. Almost all of the learners indicated that "side-talk," although often unrelated to the training content, and (therefore distracting), was also a valuable source of information – particularly procedural information. These learner perceptions are reflected in the following comments:

- "Some people were distracted and distracting. Maybe they were sitting too far from the monitor and just found it too hard to focus on the program. Whatever the reason, there was a lot of talk going on."

- "The side-talk is absolutely valuable because often it's your peers at other branches that you're sitting with. And we don't get much opportunity to site with peers and just chat about obstacles. You find a lot of personal experiences come out."
- "Right now we're going through a bank merger and trying to consolidate our branches. People have a lot of questions that they are trying to get answers to. Was all of the talk related to the training? No. Was it important? Absolutely."
- "A lot of time, you walk away having networked with someone about a procedure that might just work in your branch."
- "Today I was a little disappointed in that people were talking amongst themselves. It was all work related but I found I had it hard to focus on what the host was saying."
- "You want to have at least one manager in at those sessions to make sure that people take it seriously. In this case there were two MSS [Managers Sales & Service]. The branch managers' presence may have made a difference."
- "There should be some expected conduct of those individuals attending that you are there to learn – and any distraction from that is a distraction not just to themselves but to everyone around them."
- "You're not in a classroom area and not being specifically rude when there isn't a live body in front of you. People feel that they could just go right ahead and talk and its not going to matter."

Small group discussions. As Table 9 shows, satellite sessions #5 and #1 spent the greatest amount of time in face-to-face small group discussion activities (21.7% and 12.1% respectively) and were also rated highest in learner satisfaction. These findings suggested that small group discussion activities were important for learner satisfaction. Qualitative data

validated these quantitative findings with learner comments that emphasize the importance of this interactive activity:

- "They [small group discussion activities] were important for sharing ideas and getting feedback on what you're doing form other people doing the same job."
- "Small group discussion helped. If you didn't have those exercises there wouldn't be much opportunity to get to know other people."
- "Quite often what you find – especially since we have a mix of Green and Red managers now, that when there is an opportunity to talk about things, it's a wonderful forum."
- "It does contribute to the interest level. It gives you an opportunity to chat and gives you a breather from listening to the satellite trainer."
- "The discussions gave you an opportunity to give thought to the subject at hand – test your knowledge of the subject."
- "A little more group interaction at the site would have been good. This would improve the overall level of activity."
- "It [small group discussion] definitely contributes. It changes the medium from just watching television to having a conversation with someone about the material. It definitely has value."
- "No one left the groups during discussion. We all did of the activities."

Similar to the previous findings concerning "side-talk," some learners reported a tendency for people to get side-tracked into discussion unrelated to the instructional purpose of the small group discussion activity. However, most learners did not perceive this tendency to "get off track," as diminishing the value of the small group discussions:

- "Normally, those questions weren't completed. They were chat sessions."

- "I find that when we get the opportunity to talk, we sometimes get off topic."
- "The time [for small group discussions] isn't necessarily used the way it's supposed to be used. If we need to come up with three [answers] we'll come up with two and get off topic."
- "In my group, we didn't stay on track during our discussion exercises. But you're still talking about job related things so the interest is there."
- "People were all over the place. Quite often, when you're in that type of environment there's sharing of information that may not be directly related to what the satellite course is. But it still has absolute huge value."

"Call-ins". Interviewee comments indicated that learners perceived "call-ins" to be a form of learner-learner interaction, not, as one might expect, "learner-instructor." The reason behind this perception was that individuals regarded speaking "on air" through the handset was a very public form of communication directed as much to "everyone out there" as to the instructor. The fact that some individuals clearly commented that they would have less difficulty calling in if only the instructors heard their call suggested that they were more keenly aware of "call-ins" as a form of learner-learner interaction than learner-structure. This view caused me to *change* my own categorization of "call-in" activity as learner-learner interaction.

Satellite session #5 had the greatest number of learner calls (34) and was also rated highest in terms of learner satisfaction. However, this does not necessarily denote a positive relationship between learner calls and learner satisfaction because the number of calls is also a function of instructional design (i.e., the number of "call-in" opportunities that are

incorporated in the satellite script) and timing (i.e., the more time each caller takes, the fewer calls the instructor can accept).

Generally speaking, the number of "call-in" questions that learners posed to the instructor(s) or subject matter expert(s) was related to higher overall satisfaction in the training. Satellite session #1 and #5 had the greatest number of "call-in" questions and were also rated highest in terms of learner satisfaction. Few or no "call-in" questions occurred during the other three satellite sessions, even though instructors gave ample opportunity for learners to pose questions during "question and answer segments." These findings suggest that there is a positive relationship between learner satisfaction and learners' participation in this type of interactivity.

Comments recorded in the interviews indicated that learners ascribed value to "call-in" questions only to the extent that these questions were perceived to be relevant and representative of questions shared by the larger group. Questions that did not meet these criteria were judged to be a "waste of time." Some individuals indicated that "call-in" questions posed by other learners were important in terms of self-efficacy because they confirmed that others shared their concerns. Learner perceptions of "call-in" questions are illustrated in the following comments:

- "It [the "question and answer" segment] did help me. That's where I ended up taking most of my notes. This is the information that I would most likely remember."
- "The questions were really important…but it depends on the quality and quantity of the questions."

- "It depends on the quality of the audience. When I went to the sessions that were mostly [delivered] to branch managers, the depth of questions, angles, issues – all of these we could recognize because it was our peer group."
- "We could all relate to the obstacles in the questions that were asked, and in the solutions the panel was offering. They [the questions] were more relevant to us."
- "Those were the most interesting part of the training. The questions were relevant to where we were coming from."
- "The questions were good. They give individuals an opportunity to address what they are unsure of. And they give the host an opportunity to get feedback about what is on people's minds."
- "Was it [the "question and answer" segment] beneficial? Not really. In my session the questions and comments were more negative. It was more of a complaint session."
- "Some of the questions don't contribute a lot. It depends on the question and how relevant it is to others."

Listening to peers questions and comments. Satellite sessions #1 and #5 which showed the greatest percentage of time spent attending to peer comments made through the satellite medium were also rated highest in terms of learner satisfaction. The qualitative data also supported the finding that learners perceive this form of "remote peer interaction" to be valuable and engaging. Similar to the findings under the category of "call-ins" (see above), most interviewees reported that they found value in listening to comments and questions made by their peers at other sites. When questions or comments were considered to be representative of what "the group thought or felt," then learners perceived peer "call-ins" as a form of vicarious interaction which maintained their interest. The following interview

comments reflect these perceptions:

- "Hearing from people at other sites was just as important as hearing from people at my own site."
- "It [listening to people at other sites] very much contributed to my interest level."
- "Different areas have different challenges. You get different ideas. We had some things in common, but there were regional marketing differences too that were interesting to hear about."
- "Some of those people would ask the same questions going through your head."
- "It was interesting to hear what the questions are in different market areas."
- "Other sites thought of things I wouldn't have thought of."
- "Hearing other people's questions helped answer some questions in my own mind about how all of this was going to work."
- "You want to hear what other people have to say. That is what interested me the most, when other people commented on something."
- "It depends on the quality of the responses. When the third person would say the same thing, I found it boring and not helpful."

Audience size. A significant finding in the qualitative data concerned learners perceptions of the audience size in a given satellite session. Even when the instructors stated the exact number of participants "logged in" at the beginning of a session (usually less than 300 individuals), learners *consistently* over-estimated the audience size to be in the many hundreds, and even thousands of participants. As a result of this perception, some learners expressed a reluctance to interact through "call-ins" that might potentially be heard by hundreds, even thousands of people. The following comments express these perceptions:

- "You feel like you're in first-year Psychology [class] where you have 1,000 or more people in your class. When you're in that kind of a situation, most people would not put their hand up to ask a question. Some people would, but most would not."
- "I would say the number of participants would be in the thousands. Why not? Isn't that what satellite is for, hitting as many people as possible?"
- "There were over 300 people – maybe 500 people – because they do it to get more people. That's the whole reason for satellite."
- "You feel like a small fish in a big sea. There's so many people out there – 400 or 500 anyway."
- "You're a voice that people all over Ontario are hearing…"
- "There were about 500 plus people in the session listening in. I would rather not call in unless I have to."
- "It could be the sheer dynamics because they know that a lot of people will be listening to you. Because we know that, for example, all of Ontario region is being trained that day. That's a lot of people."
- "I've never asked a question in six years. If I'm going to ask a question I'm not going to ask it on TV, in front of, or to the ears of potentially hundreds of people."
- "In the second session we were just all over the map. At my site there were 20 people, and with 100 sites – that's in the thousands! Do I want to voice my opinion to so many thousands of people?"

Advantages and Limitations of One-way Video, Two-way Audio Satellite Training for Designing Interactivity

Earlier in this report, it was established that the most significant benefit that learners derived from synchronous interaction in satellite training was the potential to obtain clarification on instructional content. The configuration and conventions of satellite training, as represented in the Bank's Satellite Learning Network, present certain advantages and limitations for achieving interactivity that addresses learners' need for clarification. Many of the observations cited here were drawn from the interview transcripts; others are based on my own insights developed through four years of personal experience in designing and developing satellite training at the Bank. The advantages and limitations of designing for interactivity in this satellite network are identified as follows:

- **Advantages:**
  - Real time interaction;
  - Face-to-face communication;
  - Subject matter experts; and
  - Vicarious interaction.
- **Limitations:**
  - Cost;
  - Lack of "eye contact";
  - Media-centric focus;
  - Specialized skills; and
  - Lack of on-site facilitation.

Advantages

Real time interaction. The provision for real time interaction is a definite advantage in satellite training because it bestows an "immediacy" effect upon the training (i.e. drawing the learner's attention to the instructional process) that is difficult to achieve in asynchronous modes. Real time interaction requires the learner to "attend" the training at a prescheduled time and at a location that is away from their immediate work area. These conventions of "time" and "place" create *parameters* around the learning event that delineate it from other forms of work. This is particularly important in corporate training where the instructional event takes place during working hours and must therefore compete for learners' time and attention along with other work-related issues and concerns. The conventions of real time interaction, therefore, set the stage for learner engagement in corporate training. The following learner comments illustrate this point:

- "It [satellite training] also gives people time to do the training. It forces people to set time aside for training which they might not otherwise be able to do on the job."
- "It's more disciplined. You have a time when you have to show up."
- "You don't have the same distractions that you get on the job."

Face-to-face communication. By bringing learners together in a group setting, satellite training makes face-to-face communication possible. This serves to increase the variety of interactive activities that designers can employee to maintain learner engagement and enrich the learning experience. Face-to-face communication also introduces an element of peer support that can assist learners to adapt to the more self-directed modes of interaction in satellite training. Several instances were reported in the interviews of learners helping each other to use the satellite technology for other forms of interaction such as "call-ins." In some

cases, face-to-face communication can also compensate for deficiencies in technology-mediated communication. For example, an interviewee described an instance when the receiving site lost communication contact with the studio in the first few minutes of a two-hour training broadcast. Because the learners at that site had already made the time and effort to attend the training event, one of the participants assumed a leadership role and ran a "study group" without the benefit of the live broadcast. The following comments describe the advantages of face-to-face communication:

- "Communication like this [face-to-face] is most important when everyone is going through a lot of change due to merger. It allows people to discuss obstacles so you can go back to your branch and take this coaching with you."
- "Also, there were some people in the session who had done satellite before so they helped the rest out."
- "One staff member was a manager. She was bold and didn't mind calling in. She called in for everything and wanted to be an active participant…then she would get other people to call in to saying "ok, now it's your turn to talk."
- "There were technical difficulties and we did not get the full session… Basically we couldn't log in at the beginning of the program…we lost the whole two-hour training session. That was the one with the six hours of prework, so we turned the two hours into a kind of 'study group' to review the prework."

Subject matter experts. In communicating their impressions of learner-content and instructor-content interaction, learners indicated that they value interaction with on-camera presenters who are perceived to be a credible and knowledgeable source of information. One significant design advantage in satellite training is the possibility of giving large training

audiences access to a limited number of recognized subject experts, which might otherwise be logistically impossible in face-to-face training, or less impactful in asynchronous modes of delivery. For example, in satellite session #1, over 3,000 trainees across Canada were able to participate in live presentations by two highly credible subject matter experts, within a two-week period. The following learner comment relates specifically to satellite session #1:

- "The Advisor's Forum [satellite session #1] was very good. We found the panel was outstanding. They were very knowledgeable and provided some very good answers to our questions – real insights to the whole area of investing."

Vicarious interaction. Learner "call-in" activities, such as using the handset to ask a question or make a comment to the instructors/presenters are an important part of obtaining clarification on instructional content. Logistically speaking, the sheer number of learners who participate in satellite training sessions makes it impossible for each and every learner to participate overtly in this kind of interactive activity. However, evidence in the qualitative data suggested that when individuals ask "thought provoking" questions and comments that are representative of the group, this is perceived to provide a vicarious form of interaction which maintains the interest of the group. The following comments illustrate this point:

- "Hearing other people's questions helped answer some questions in my own mind about how all of this was going to work."
- "Even if you don't call in, you often hear your question asked and you get a response to it – those are the most interesting [questions]."

Limitations

Cost. Satellite training is costly to produce and deliver. Rental of studio and satellite time is expensive, and production costs are high. Corporate training is first and foremost

driven by business interests in which cost efficiencies often take precedence over instructional design principles – particularly in the absence of convincing research to guide practice and argue a convincing case for adherence to principles of learning. For example, in determining training audience size, the practice of satellite corporate training is governed by economies of scale – the larger the training audience, the lower the per person cost of training. This encourages a "broad brush" approach to enrolling trainees based on job title rather than on individual learning need. As a result, some employees attend training sessions that are redundant and provide little in the way of new information – with negative implications for learner engagement and satisfaction. Similarly, the size of the training audience for a given satellite session is largely based on "return on investment" calculations rather than on considerations of optimizing interaction.

Corporate trainers are under increasing pressure to "do more with less" – train more people, on more content, in less time and often with less money. The overriding expectation in converting classroom courses to the satellite medium is that instructional delivery time will be reduced by at least 50% or more. In fact, this is the commonly recognized and seldom challenged justification for organizations switching to distance education technologies. Under this prevailing view, interactivity is more likely to be sacrificed to cost efficiencies. The temptation is to pack as much content into the time available and to use satellite technology to create more information rather than to promote clarification of concepts. This preoccupation with content in turn leads to a "teacher-centric" instructional design, which assumes the most significant learning elements in satellite training originate from the studio. Therefore, shifting the instructional focus to activities at the receiving sites, such as small group discussion exercises, is viewed as imposing a "speed bump" in the momentum of

delivery. For these reasons, group discussion time is often limited to two to six minutes per exercise, where exercises consist of one to three discussion questions. Similarly, time allocated to "question and answer" segments is typically limited to 8% to 10% of total broadcast time.

Practical cost considerations also limit to what extent instructional designers are able to utilize the full capabilities of the instructional medium. Many of the production features that make television such a rich and powerful medium are beyond the reach of training budgets.

Lack of "eye contact". In satellite networks characterized as one-way video, two-way audio, learners can see the instructor through the television monitor but the instructor has no visual contact with learners at the receiving sites. Therefore, the instructor has no way of knowing if learners are attending to the lecture, staying on task during the completion of small group discussion exercises, or even if learners have left the training site half way through the broadcast.

The lack of "eye contact" is a serious drawback to the instructor's ability to "connect" with remote learners and appears to negatively impact learner-instructor interaction. It is a feature of satellite interaction which learners intensely perceived to be a deficiency. Psychologically, the lack of visual contact between learner and instructor creates a sense of "disconnection" in which learners are left with an impression of the satellite instructor as not "real," "impersonal," "not there" and "out of touch."

Media-centric focus. As an instructional technology, satellite training is a hybrid that combines the well-defined conventions and production standards of television with the less defined tenets of learning theory. Therefore, it is not surprising to find that television production standards overshadow instructional design principles in the development and

delivery of satellite training.

Typically, instructional designers utilizing satellite technology have borrowed techniques from traditional broadcasting. For example, the instructional plan takes the form of a "script" with all the formality and structure that this concept implies. Delivering a satellite training session requires the carefully choreographed efforts of the instructor(s), director and studio technicians to ensure a high (television) quality production. Distance training practitioners must consider staging, shot selection, turn-taking between presenters, time utilization and audio management. Therefore, the instructional plan must be documented as a comprehensive and carefully timed "script" which instructors are compelled to deliver more or less verbatim since studio technicians listen for key word phrases to cue camera angles and PowerPoint slides. Interactivity is pre-planed and "hardwired" into the script with little room for customizing delivery to the needs of a particular training audience. Instructors have limited leeway to be spontaneous and deviate from the script since this may confuse the technicians and cause the program to run past its allotted time. Even running a few minutes over a program's scheduled time could potentially be disastrous if the studio and satellite are rented to another organization in the next time slot.

Careful adherence to a script, the lack of spontaneity in delivery and a necessary preoccupation with time all contribute to learners' perceptions that interaction in satellite training is "mechanical," "scripted," "formal" and "impersonal." The following comments make these points:

- "I feel that the training is very scripted and doesn't offer very much in the way of practicality, or practical solutions based on what our group might be feeling."

- "It looked like the instructors were just reading stuff…There's not a lot of deviation from a script and that's why it's boring."
- "They [the instructors] would often say 'put your hand up and ask a question' but it's not the same as a classroom environment where the teacher may deviate a little – inject a little of their own experience."
- "Time is limited. They clocked the time. Even when we were working in the discussion groups we had the feeling that the clock is ticking…After time is up, you're cut off."

Specialized skill. The design and delivery of satellite training calls for specialized skills. To the extent that satellite training is a hybrid of television media and instructional technology, those involved with its design and development must have a thorough working knowledge of both these disciplines. Such a blend of specialized expertise is difficult to find in corporate training where project-centric concerns for flexibility in allocating human resources encourage instructional designers and instructors to develop "generalist" skills in both face-to-face and distance modes of training. However, an instructor who is skilled in the traditional classroom setting cannot easily transfer those skills to the satellite training environment. The skill and competence of those assigned to design and deliver satellite training has a definite impact on the quality of interaction.

Lack of on-site facilitation. Many aspects of the satellite learning experience are beyond the control of the instructional designer. The most significant of these are the physical conditions at the receiving sites. The lack of on-site facilitators at the receiving sites is a significant limitation in ensuring the quality of interaction learners experience at these sites. For example, technical problems and inadequate site conditions posed a considerable challenge for learners at sites that did not receive diligent attention from site coordinators.

Similarly, in the absence of a site facilitator, learners found little structure and support to help them adjust to the more self-directed modes of satellite interaction. Many learners reported that "side-talk" among individuals attending the sites as a definite barrier to attending to and interacting with the instructional broadcast. Some learners also reported that interactivity during small group discussions would have been more meaningful if a site facilitator had been available to help groups to focus on the learning activity. Others suggested that a site facilitator might have helped to "screen" calls from the site to ensure that they were relevant and representative of the group's concerns. The following comments illustrate these points:

- "Today I was a little disappointed in that people were talking amongst themselves. It was all work related but I found I had it hard to focus on what the host was saying."
- "I wish that people would have paid more attention to what was being presented than having conversations amongst themselves."
- "There were a lot of one-on-one conversations. It was hard to hear the monitor at times due to these conversation."
- "A lot of one-on-one conversation was going across the table, not just side-by-side. It did get to be a little distracting."
- "If you had a representative who could be in the classroom, or to monitor people in the room, they might stay on track better – take it more seriously."
- "If there could be someone at the site, especially for the first time people, to show them how to log in, explain what's going to happen. It's all a little overwhelming if you're not electronically literate."
- "There should be someone there to get the group to be a cohesive group, because everyone was doing their own thing."

- " If someone was there in charge to keep people inline, I think people would have been working together – watching you, pushing you to get involved, because a lot of people chose not to."

Types of Corporate Training Applications and Interaction Profiles

Schreiber and Berge (1998) categorize corporate training applications into three types:

- Information Dissemination and Knowledge Building;
- Critical Thinking and Technical Skill Building; and
- Attitude Change and Motivation Enhancement.

Videotapes of five satellite programs were selected for interaction analysis in this study so that each of these three types of corporate training applications would be represented in the sample. Interaction analysis was completed for each of the satellite sessions, using the Flanders-type interaction analysis instrument and the methodology described in Chapter III. The interactivity codes used for interaction analysis are described in Table 4 and summarized below:

0 – no interaction (i.e., technical difficulty)

Learner-Interface Interaction

1 – listens to instructions, protocols

2 – uses handset to respond to a question

Learner-Content Interaction

3 – listens to instructor make content presentations

4 - completes individual written exercise

Learner-Instructor Interaction

5 – listens to instructor's question and formulates a response

6 – receives and processes instructor's feedback

7 – signals instructor using the handset "Signal" key

Learner-learner Interaction

8 – listens to peers debrief of discussion exercise (instructor initiated)

9 – listens to peer-initiated comments/questions

10 – engages in discussion with peers at site

11 – engages in unstructured social interaction with peers at site

Using the above codes to record and analyze interaction, profiles were produced for each of the five satellite sessions showing the relative distributions of instructional time spent in each of the four types of interaction. Interaction profiles were then compared to determine if different types of training applications are characterized by different interaction profiles, that is, by different relative distributions of instructional time spent in each type of interaction. In characterizing the different interaction profiles, the percentage of instructional time spent in various types of interaction was ranked using the following scale:

- **Low frequency** – less than 20% of instructional time;
- **Medium frequency** – 20% to 30% of instructional time; or
- **High frequency** – more than 30% of instructional time.

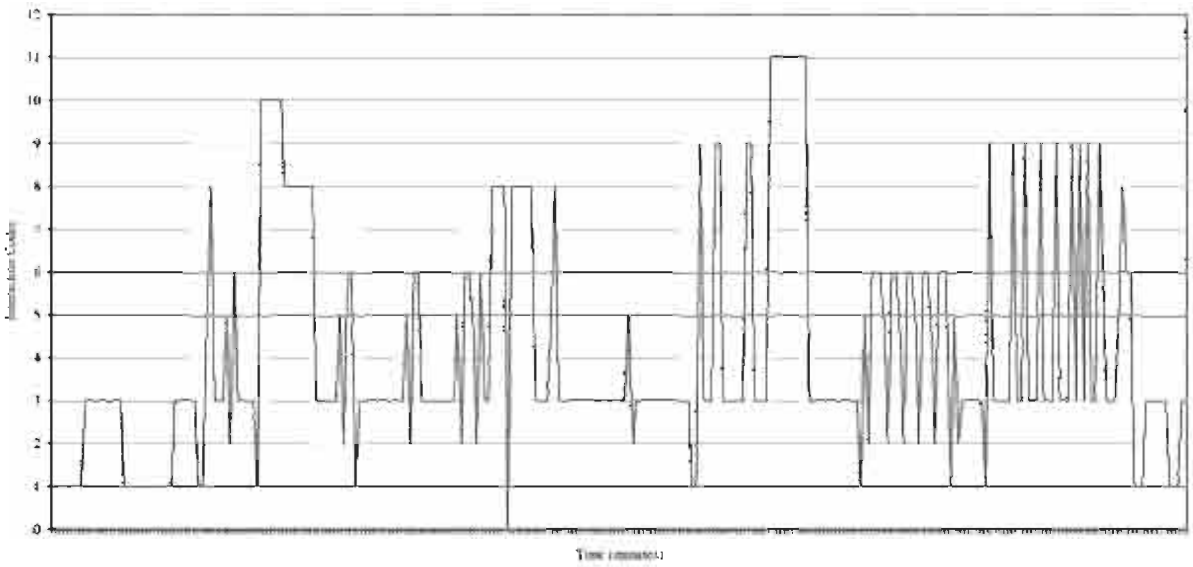
The interaction profiles that emerged through analysis are described in the next three sections.

Information Dissemination and Knowledge Building

Satellite session #1 is an example of an "information dissemination and knowledge building" corporate training application. The objectives of this training program may be categorized in the "knowledge" and "comprehension" levels of cognitive domain objectives

(Rothwell & Kazanas, 1992, p. 132). The interaction profile for this training application is shown in Figure 2. Interaction codes are shown on the X-axis. Time, in minutes, each representing two 30-second units of coding, is shown on the y-axis.

Figure 2. Information Dissemination and Knowledge Building – Interaction Profile (Satellite Session # 1)



The interaction analysis findings reported in Table 5 show that satellite session #1, as an example of a "Information Dissemination and Knowledge Building" training application, is depicted by an interaction profile that is characterized by the following[6]:

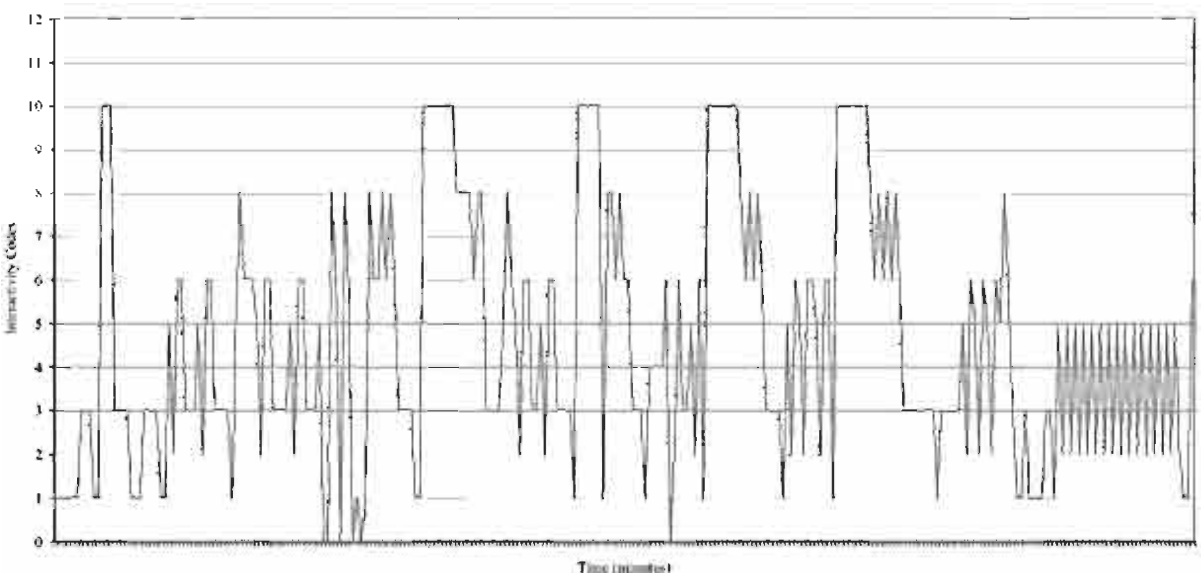
- Low frequency of learner-interface interaction (16.5% of instructional time);
- High frequency of learner-content interaction (52.4% of instructional time);
- Low frequency of learner-instructor interaction (13.1% of instructional time); and
- Low frequency of learner-learner interaction (17.7% of instructional time).

[6] Percentages of instructional time spent in each type of interaction are taken from Table 5.

Critical Thinking and Technical Skill Building

Satellite sessions #2, #3 and #4 are examples of a "critical thinking and technical skill building" training application. The objectives of these training sessions are characteristic of the " application," "analysis" and "synthesis" levels of objectives in the cognitive domain (Rothwell & Kazanas, 1992, p. 132). The interaction profile for this type of training application is shown in Figure 3. The interaction profile for satellite session #2 was selected as a representative sample of this type of training application because of the three (satellite sessions #2, #3 and #4) this session was rated the highest in terms of learner satisfaction.

Figure 3. Critical Thinking and Technical Skill Building – Interaction Profile (Satellite Session # 2)



The interaction analysis findings reported in Table 5 show that satellite session #2, as an example of a "critical thinking and technical skill building" training application, is depicted by an interaction profile that is characterized by the following [7]:

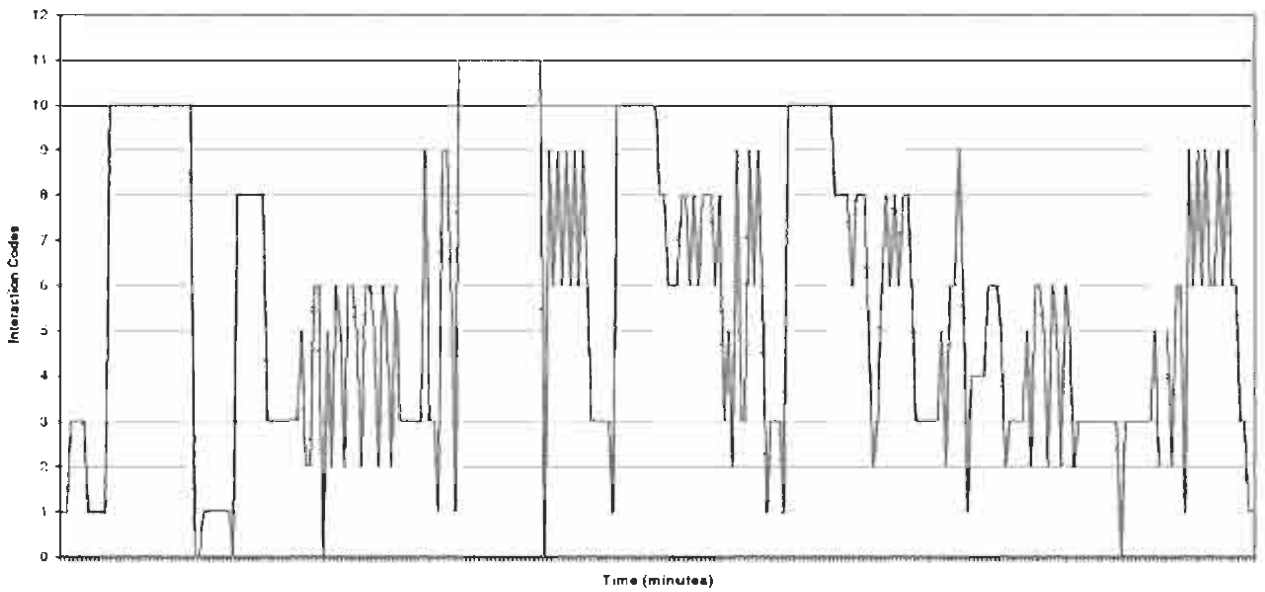
[7] Percentages of instructional time spent in each type of interaction are taken from Table 5.

- Medium frequency of learner-interface interaction (23.0% of instructional time);
- Medium frequency of learner-content interaction (25.3%.4% of instructional time);
- Medium frequency of learner-instructor interaction (28.5% of instructional time); and
- Medium frequency of learner-learner interaction (21.4% of instructional time).

Attitude Change and Motivation Enhancement

Satellite session #5 is an example of an "attitude change and motivation enhancement" corporate training application. The objectives of this training program reflect the "receiving," "responding" and "valuing" levels of objectives in the affective domain (Rothwell & Kazanas, 1992, p. 133). The interaction profile for this type of training application is shown in Figure 4.

Figure 4. Attitude Change and Motivation Enhancement -- Interaction Profile (Satellite Session #5)



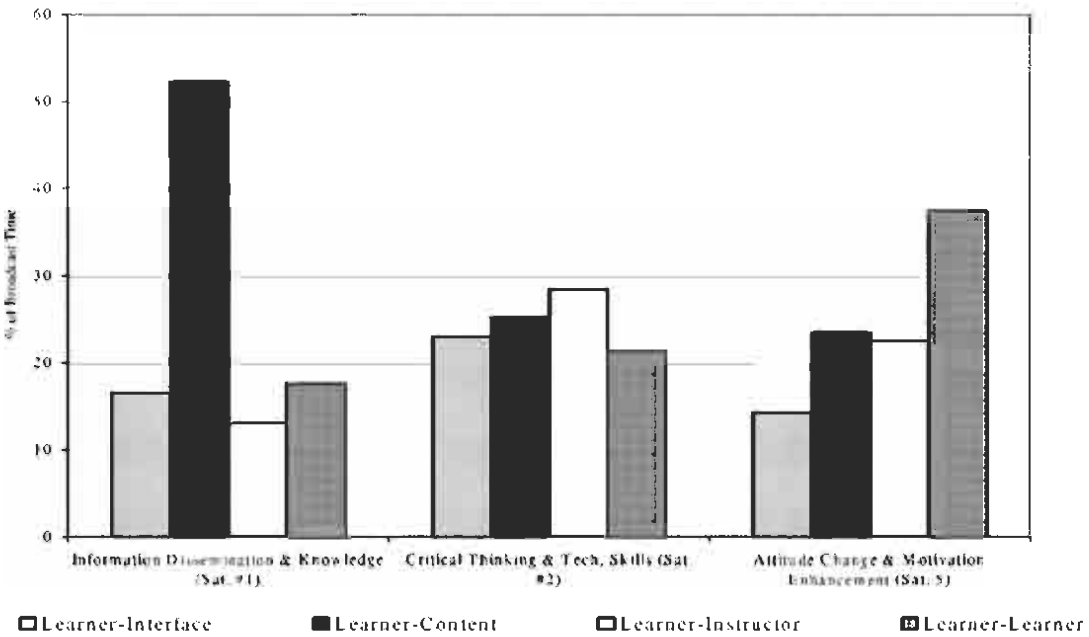
The interaction profile for an "attitude change and motivation enhancement" training

application (see Figure 4) shows the following characteristics[8]:

- Low frequency of learner-interface interaction (14.3% of instructional time);
- Medium frequency of learner-content interaction (23.6% of instructional time);
- Medium frequency of learner-instructor interaction (22.5% of instructional time); and
- High frequency of learner-learner interaction (37.4% of instructional time).

These findings suggest that different types of training applications are characterized by different interaction profiles as defined by the relative distributions of instructional time between the four types of interactivity. These comparative findings are summarized in Figure 5.

Figure 5. Interaction Profile Comparison



[8] Percentages of instructional time spent in each type of interaction are taken from Table 5.

Variables that Influence Learners' Motivation to Interact in Satellite-based Training

One of the key themes that emerged from research gathered in the context of corporate satellite training is that the learner's participation in interactive activities is entirely voluntary. A number of variables were found to influence learners' motivation or "readiness" to participate in interactive activities during satellite training. These variables are identified as:

- Self-concept;
- Workplace transition;
- Peer reference group attitudes;
- Probability of success; and
- Risks and rewards.

Self-concept

A compelling theme that emerged in the qualitative data is that a learner's self-concept plays a role in determining how likely the individual is to engage in certain types of interaction activities. Self-concept refers to a relatively stable set of perceptions people hold about themselves, such as likes, dislikes, values, abilities and personality traits. These self-perceptions appear to influence learner behaviour with respect to interaction, predisposing learners to some types of interaction and precluding others. For example, learners who described themselves as "shy" were unlikely to participate in interaction activities that require them to call in and speak with the instructor. People who actively used the "call-in" feature of satellite communication were perceived by other learners as being "bold" or "brave." Learners who described themselves as "quiet" reported that face-to-face learner-learner interaction at the sites seemed awkward and uncomfortable. Learners who described

themselves as "easily bored," or indicated that they were somewhat "impatient" with other people's opinions reported that they were easily "distracted" and found it difficult to attend to instructor lectures (learner-content interaction) and/or other learners' comments (learner-learner interaction). The following comments describe the variable of "self-concept":

- "I tend to get bored very easily, sitting in a room in front of a TV with other people, I tend to get distracted."
- "I'm typically shy in class. I go there and I can't pick up the phone."
- "I'm quite nervous about calling in…but I don't mind participating in other ways."
- "If you're a quiet person you may not get to know other people at all."
- "Everyone at my site was very, very timid. No one would participate with the instructor or with each other. Everyone just sat and did their own thing."
- "You still had the problem of shy people who did not feel comfortable calling in."
- " I don't know if it's a general reluctance or shyness but people aren't calling."
- "Some people are just brave and don't mind speaking out. I'm shy and I don't feel comfortable calling in."
- "She was bold and didn't mind calling in. She called in for everything and wanted to be an active participant."
- "It made me wonder, why am I so uptight about calling in?"

Workplace Transition

Learners' participation in satellite interaction activities does not occur in a vacuum, but rather, is situated within a broader context of the corporate organization. Workplace transition originating in this organizational context was found to influence learners' willingness to "attend" training – both in terms of being physically present at the training

event and in terms of giving attention to the learning process and its various interactive activities.

Many interviewees expressed concern about the degree of change in the workplace resulting from the post-merger integration of the branches and banking systems. Red (Trust Company heritage employees) who reported experiencing workplace transition to a greater degree than Green (Pre-merger Bank heritage employees) perceived a greater need for the training content offered in satellite sessions #2, #3 and #4 than Green learners. Red learners who felt most impacted by workplace transition described the training content as "very relevant," "very useful" and "valuable." Conversely, Green learners described the content as "somewhat relevant," "a bit of a repeat," and "not useful." Generally Red learners reported a higher level of engagement in activities such as note taking, whereas Green learners reported taking few if any notes during the satellite training. The following comments describe the different impact of workplace transition on Red and Green learners:

- "Paying attention was a challenge. I didn't find the content of the material that useful. Part of it was that perhaps I shouldn't have been there in the first place. It was material that had to do with the roll out of the FA strategy in CT branches. But I had already been living that strategy for four years. So there wasn't anything new for me." (Green)
- "A lot of the training was very helpful – especially from the CT side which didn't have portfolio management experience. I'd say about 90% of it was helpful." (Red)
- "The first training session was the largest – 15 people. By the third session, today, it dwindled down to four people – all Red. Once the Green heritage people realized the course content was repetitive for them they reprioritized – taking their customer's appointment instead. The Red people continued to come." (Red)

- "I took about two or three notes per page." (Red)
- "There was a lot of chatting going on before and during the broadcast. A lot of it was repetitive learning for a lot of us so you tend to lose focus and it's all very mundane." (Green)
- "My girlfriend said that at her session they just talked the whole time. Most were Green people." (Red)

Both Red and Green employees questioned the timing of some of the satellite training sessions in the context of workplace transition. Many learners reported that they were reluctant to take time away from other work priorities in order to attend the training. The implications of workplace transition as a context of satellite training are captured in the following comments:

- "A couple of us thought that given the time right now of the merger, we're all really busy – all of us are feeling a little behind. Just being taken off site right now, our attention probably wasn't all there. Our mind was wandering to all the things we had to do when we got back." (Red)
- "We've all just gone through conversion – new systems, new processes between CASS and Western credit vendors etc. Adding one more thing on – we're almost inundated with admin. problems that have happened through conversion – and you've added this on to us. I guess we're a little less receptive to doing this and figuring this out and how it's going to work." (Focus Group – Red)
- "The training, it's hard to focus on it. You've got so much other stuff going on that maybe its not as effective. So you're not going to get as much buy in on it, necessarily." (Focus Group – Red)

- "They introduced this within 3-4 weeks of branch conversion. We've been going through a lot changes. There's a lot of challenges out there right now." (Red)
- "People were feeling 'I don't want a portfolio right now [subject of training] – I can hardly get the work I have done'." (Red)

Peer Reference Group Attitudes

The attitudes of the peer reference group (i.e. other learners at the site) towards various forms of interaction, were an important variable in influencing some people's motivation to engage in interactive activities during satellite training. Some learners' comments suggested they were sensitive to verbal and non-verbal signals from the peer reference group in determining an appropriate level of personal participation in interaction activities. For example, some learners reported that they and others seemed to take their cues from the peer reference group to determine how much effort and attention would be applied to small group discussion exercises (learner-learner interaction). Some groups took the discussion exercises "seriously"; others used the time to engage in non-training related discussion. Similarly a learner described an instance when a keen participant at the site "called in for everything" and encouraged other people to do the same.

Some of the interview comments suggested that learners self-evaluated their own inclination for interaction based on the reactions of their peer reference group. For example, individuals observed how instances of interaction by other learners were perceived by their peer reference group in order to evaluate how their own engagement in such activities may in turn be judged by others. They were particularly sensitive to the negative perceptions of the peer reference group to instances when learners at other sites called in with questions or comments. From the nature of the comments it was clear that this sensitivity stemmed from

the individual's desire to avoid situations that might potentially cause embarrassment. The influence of the peer reference group attitudes as a variable in motivating interaction is described in the following comments:

- "I noticed that other individuals calling in would go 'hello, hello?' I guess they weren't sure if the instructors could hear them. People would just go through this 'hello, hello' thing every time – of course we just laughed."
- "People at the site weren't really working during the discussion exercises. No, they were more distracted, unless there was one person in the group that has decided that they are going to take these sessions very seriously."
- "I think you tend to get a couple of folks that monopolize the air. Sometimes they call in with information that is completely irrelevant and our reaction was 'no one really wants to hear it'."
- "Some people would ramble on about things that were repetitive. People were just saying the same points over and over again. The feeling in the room was, 'alright, let's just move on'."
- "Some comments didn't make sense and we laughed at them – I know you shouldn't but they really didn't make much sense."
- "Small group discussions weren't done unless there was one person in the group that has decided that they are going to take these sessions very seriously."
- "One staff member was a manager…she called in for everything and wanted to be an active participant…then she would get other people to call in to saying "ok, now it's your turn to talk."

Probability of Success

Another variable influencing the learner's motivation to interact was the individual's perceptions of probability of success in doing so. For example, some learners reported that they were less likely to call in if they perceived a low probability of a successful communicative exchange. Learner's perceptions of probability of success were based on such things as the frequency of technical problems in establishing communication links between the instructor(s) and the sites; learners estimates of the "odds" of "getting through"; and the individual's self-efficacy regarding their ability to effectively communicate with the instructor(s) once a connection established. The following comments describe "probability of success" as a variable in motivating interaction:

- "I think people are intimidated about calling and not getting their message across the way you want to."
- "You know they do run these things [satellite sessions] across Canada, so chances are they might not be able to get to your question."
- "Maybe it's the fear of getting a question wrong, or even just the fact that some technical thing happens that is going to be embarrassing."
- "Some of the sites were having problems getting through because of a storm."
- "Basically there's like 400 people putting their hand up, and there is one commentator. So the odds were that you're not going to get picked any ways…I went with that lottery system."
- "You could hear some people struggling to get their message across, or to ask a question – you don't want to do the same thing."

Risks and Rewards

Learners' perceptions of the risks and rewards of participating in interactive activities were an important variable in influencing their behaviour in satellite training. Learners were more likely to report participation in interaction activities that they perceived to be "rewarding" because they were "valuable" for enriching their learning experience, such as face-to-face learner-learner interaction through small group exercises, and responding to electronic questions.

With respect to risk, some interaction activities were perceived to entail more risk than others. For example, learners felt more "comfortable" responding to interactive questions and participating in small group discussion exercises. However most interviewees indicated that they felt "nervous," "weird" or "uncomfortable" about participating in "call-ins." Although a few learners reported a higher tendency to participate in "call-ins" if there was the potential to win a small prize, most people indicated that the perceived risks involved in such activity precluded their participation.

The most obvious deterrent was the fear of publicly speaking before an indeterminate (but presumed to be large) audience. As indicated previously, learners consistently overestimated the actual size of the satellite session audience. They also perceived a risk in not knowing "who's out there listening" to what they might say. Several people expressed the concern that their comments might be heard by senior people in the organization. Some people implied a fear of negative career consequences should their comments or questions be perceived by others to be foolish or uninformed. These individuals felt uneasy about the instructors' practice of identifying callers by their first name; they even worried that their voice might be recognized by others. A clear theme in the interviews was that many learners

are keenly aware of the potential risks of participating in interaction such as "call-ins." The following comments illustrate these perceptions:

- "People are reluctant about calling in. They're probably thinking 'why should I when no one can see me any ways?' They just sit back and relax. There's no motivation to call in."
- "I think that there is a level of embarrassment. You can either sit quietly in a room and not be embarrassed at all or you can put yourself, I'm going to say, at risk of being embarrassed by pushing that button."
- "That is one of the problems in satellite training. You can not pay attention and no one is going to know except the people at the session."
- "People don't want to give a wrong response."
- "You don't know who is listening. For instance, I don't know that someone that I worked with at a previous branch isn't listening to my question and if it's not a really smart question – what if it's in the book and I missed that part of the question – then people are thinking: agh! Didn't she read the book when she came to this?"
- "I find that there is definitely just that fear factor. I don't know if my DVP [District Vice President] is listening – I don't know who is listening. And since I'm in the role of the manager I'm thinking 'should I even have that question?" I'd rather go back to the book and just look it up myself."
- "Some people still might not do it [call in] because they might think that there are people out there who might recognize their voice."
- "It is definitely a challenge when you are out there in front of a big group of people to get the message out clearly."

Compared to learners' perceptions of the risks involved in participating in certain types of interactive activities, the rewards of participating were perceived to be trivial or non-existent and even "negative reward" when learners considered the "opportunity cost" of training. In some of the satellite sessions, instructors would periodically promise small prizes to callers. This practice did appear to be somewhat successful, judging by the increased number of calls in response to questions for which prizes were offered. However, during the interviews only three of the 19 participants remarked on the prizes as motivators for calling in. Several interviewees (six out of 19) commented on the negative consequences of being away from their branch to attend training events, both in terms of falling behind in their work, and in terms of the lost opportunity to generate new business. Part of the annual salary for these employees consists of incentive compensation that is determined by a number of performance measurements, including personal sales revenues. Therefore, attending satellite training sessions entails an "opportunity cost" for learners that could have a negative impact on their salary. In instances where Green learners perceived little value in the training content, they "reprioritized" to attend to their branch customers instead of the training. Also, several learners commented that one of the reasons they were reluctant to call in during satellite session was that, in doing so, it would prolong the time of the training. One of the biggest benefits some learners associated with satellite training was that it reduced the amount of training time they had to spend away from their branches and their customers. The following comments illustrate these perceptions:

- "The best thing with satellite is the convenience which means less time away from my [customer] portfolio. Time is a big thing. Courses in Toronto would take a whole day.

With satellite there is less disruption to my day. I get to the satellite site in about ten minutes, attend the session and get back to my workload."

- "Let's just get on with it. I'll just take my learning and go home kind of thing."
- "If we all rang in, we would never get out of there."
- "The first training session was the largest – 15 people. By the third session, today, it dwindled down to four people – all Red. Once the Green heritage people realized the course content was repetitive for them they reprioritized – taking their customers' appointments instead."
- "I didn't find a lot of extra value from the satellite. I could have used my time more productively at the branch."
- "The satellite sessions should be schedule at times that are a little more on an off time so people aren't worried about what's happening with their portfolios. Maybe if the sessions could be on weekends…Shorter sessions would be better – but schedule them before work so you don't miss your clients."
- "Many people are reluctant to attend [satellite sessions] due to taking time away from their ability to generate sales revenue. Timeframes might be something that could be looked at."

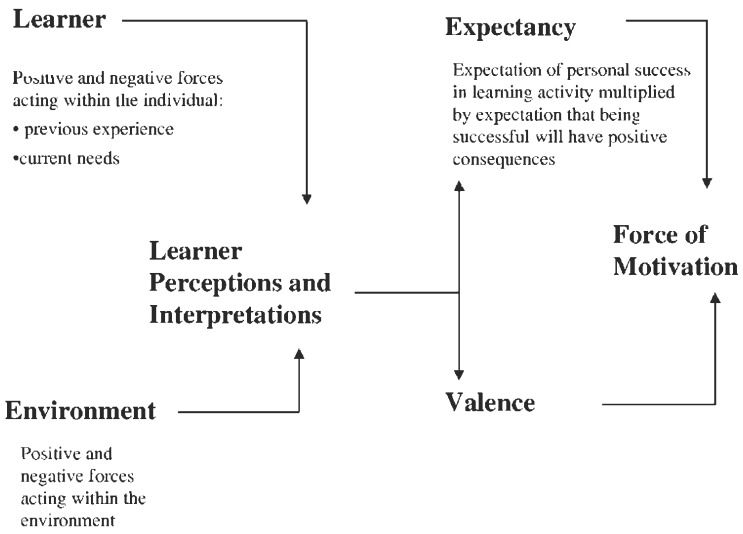
Theoretical Frameworks to Guide Distance Training Professionals in Designing Interactivity for Satellite

Given the key finding in this study that learner interaction in satellite training is a *voluntary* phenomenon on the part of the learner, theoretical frameworks that seek to understand learner motivation might guide distance training professionals in designing interactivity. In particular, two theoretical frameworks proposed by Rubenson (1977 in

Cross, 1988 pp. 115-119) and Cross (1988, pp. 124-131) are potentially useful in this respect. Both Rubenson's and Cross's theoretical models attempt to explain the adult's motivation to participate in organized education in order to inform those involved with the *recruitment* of learners for educational programs. Although these models were not specifically created to explain learners' motivation to interact *during* organized educational events, they do provide some useful concepts that may be applied to understanding the phenomenon of learner participation in interactive activities.

Rubenson's Expectancy-Valence model (1977 in Cross, 1988 pp. 115-119), (see Figure 6), draws from the psychological theories of motivation to explain human behaviour in terms of the interaction between the individual, including his/her acquired experience, and the environment, as the individual perceives and experiences it. According to Rubenson, the strength of the individual's motivation is determined by combining positive and negative forces working within the individual and within the environment.

Figure 6. Rubenson's Expectancy-Valence Model

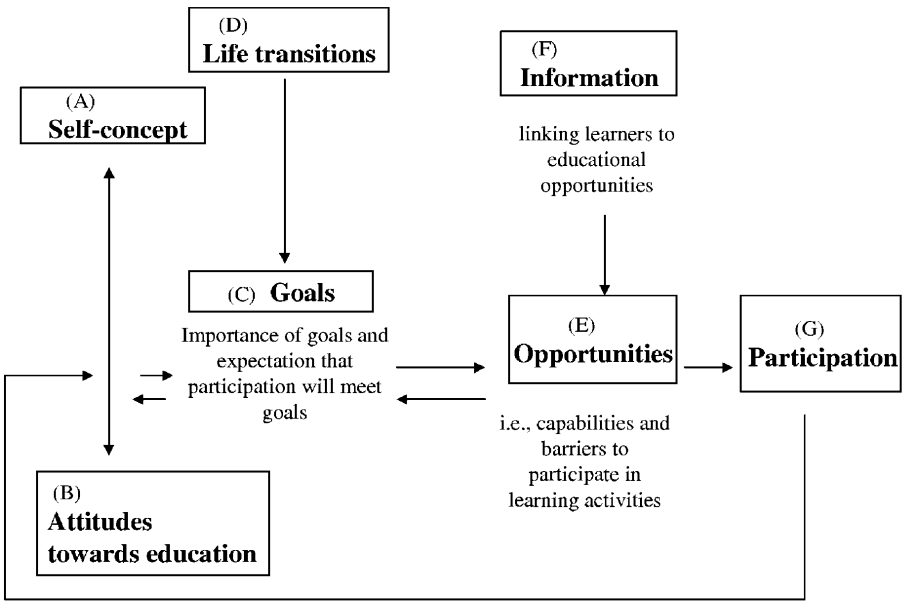


Rubenson's model is primarily concerned with how an individual perceives his/her environment and what s/he expects to gain from participation in adult education. Rubenson proposes a formulaic approach to understanding learner motivation. The "expectancy" part of the formula consists of two components: the adult's expectation of personal success in the learning activity; and the expectation that being successful in the learning activity will have positive consequences. Rubenson describes these two components are "multiplicative." This means that if either of these components assumes a value of zero – i.e., the individual does not perceive himself able to participate successfully, or perceives no reward for doing so – the outcome is zero and there is no motivation to participate. The "valence" part of the formula is concerned with the adult's attitudes towards participation, which may be positive, indifferent, or negative. Rubenson describes the strength of valance as an algebraic sum of the values the adult invests on the various anticipated consequences of participation. It is important to note that in Rubenson's formula the individual's perceptions play a critical role

in motivation. Motivation, according to Rubenson, is based on the individual's "perceived situation," which may or may not be the "real situation" (Cross, 1988, pp. 115-119).

Cross's Chain-of-Response (COR) model (see Figure 7) is presented as "rough beginnings of a conceptual framework designed to identify the relevant variables and hypothesize their interrelationships." It does not claim to be a predictive theory about "who will participate in which adult learning activities" (Cross, 1988, p.124). Cross's model assumes that the adult's participation in learning activities is "not a single act but the result of a chain of responses, each based on an evaluation of the position of the individual in his or her environment" (p. 125). Cross conceptualizes the learner's behaviour as a "constant stream rather than a series of discrete events" (p. 125). The ordering of the "forces for participation in adult learning activities," presented in Figure 7, suggests a continuum that begins with the individual and moves to increasingly external conditions. However, Cross emphasizes that "it must be generally understood that, in any interaction situation, forces flow in both directions. Ultimately, participation in adult learning changes self-perceptions and attitudes about education" (p. 125).

Figure 7. Cross's Chain-of-Response (COR) Model



Summary

In this chapter, my challenge was to describe the findings that emerged from the data so vividly that the reader could almost "see" the incidents of interaction described and "hear" the personal perceptions of interview participants. Learners reported that real time interaction *does* make a valuable contribution to their satellite training experience; however, their motivation to participate in various interactive activities was influenced by such factors as self-concept, workplace transition, peer reference group attitudes, as well as their perceptions of the relative risks, rewards and probabilities of success associated with these activities. These findings, and others, are discussed in more detail in the next chapter.

CHAPTER V

DISCUSSION, CONCLUSIONS, RECOMMENDATIONS

Introduction

The purpose of this study was two-fold. The first was to examine the importance of interaction in corporate satellite training, using constructs for interaction proposed by Moore (1989), Hillman et al. (1994), and others in order to generate a theoretical framework to guide distance education practitioners. The second purpose was to apply an Instructional Systems Design (ISD) approach to identify instructional strategies for maintaining learner interest and involvement in one-way video, two-way audio satellite-based training. This chapter concludes the final phase of the grounded theory process by providing a summary of results and a comparison of the emerged theory and discovered hypotheses with the extant literature to examine what is similar, what is different and why. A complete presentation of results is provided in Chapter IV.

As appropriate, this chapter will offer recommendations to guide distance education practitioners in the planning, design and delivery of satellite-based corporate distance training.

Discussion of Results

Enhanced Understanding of Interaction

The results of this study support the view, widely prevalent in the literature, that interaction (i.e. the active participation of learners) is a necessary condition for successful training (Neisser, 1976; Kerka, 1989; Moore, 1989; Graham & Wedman, 1989; Shale & Garrison, 1990; Fulford & Zhang, 1993; Hillman et al. 1994; Saba, 2000; Siantz & Pugh,

2001). As the findings show, if given a choice, learners will chose a form of training that offers interaction, and specifically synchronous interaction, rather than forms of training which are perceived to provide little or no interaction. Learners identify the opportunity to obtain clarification and confirm meaning of concepts as the most significant purpose and value of interaction. The immediacy impact of synchronous interaction is considered to be particularly important in corporate distance training where learning events must compete for time and attention with other work-related activities.

There was evidence in this study to support a conceptual framework of interaction in terms of learner-interface, learner-content, learner-instructor and learner-learner; however, learners' perceptions of the behaviours and activities that constituted each type of interaction was found to be somewhat different from that which is described in the literature. For example, satellite-mediated communication between the learner and the instructor was perceived to be a form of learner-learner interaction, not learner-instructor, because individuals were intensely conscious of the fact that a vast learner audience was hearing the conversation. Similarly, learners perceived interface interaction to involve more than interaction with the technology, as reported by Hillman et al. (1994). For them interacting with the instructional interface of satellite training included their perceptions of and experiences in the satellite receiving sites.

Much of the current thinking about interaction in distance training assumes that most learners will be motivated to engage in interactive activities and that the removal of barriers through technology and instructional opportunities is all that is needed to permit them to do so. In examining learners' participation in educational opportunities, Cross (1988) cautions us to regard this assumption with a fair amount of scepticism (p. 119). The results of this

study show that, all things considered, learners do not demonstrate an equal *need* or *desire* to participate in the four types of interaction described in this study. The type of training application was found to be a significant factor in determining the relative importance of instructional time spent in learner-content, learner-instructor and learner-learner interaction. This further suggests that different types of training applications are characterized by different types of interaction profiles. No corroborating evidence for this conclusion was found in the literature, whereas Fulford and Zhang (1993) observe, "interaction" has been treated as a generic teaching technique (p. 18); however, the possibility for different interaction profiles is suggested by Moore's (1989) statement that, "educators need to organize programmes to ensure maximum effectiveness of each type of interaction, and ensure they provide the type of interaction that is most suitable for the various teaching tasks of different subject areas" (p. 5).

The results of this study further show that learners do not perceive various interactive activities as generic forms of interaction. On the contrary, learners distinguish between types of interaction based on perceived levels of risk that these activities entail. Learners were less motivated to engage in interactive activities which were perceived as high risk (i.e. "call-ins") and more likely to participate in activities that perceived to be low risk (i.e. responding to electronic questions). Haughey (1985), reported similar learner behaviours but did not draw the same conclusions concerning learners' perception of risk as a factor in their participation in interaction.

This study recommends refining our understanding of interaction from general constructs and frameworks to more theoretical models that can be applied to the daily practice of distance education and training. This chapter represents an attempt to identify a

model for interaction that can be applied in the substantive area of corporate training.

Learner-Interface Interaction

Hillman et al. state that learner-interface interaction is a process of manipulating the delivery technology in order to accomplish the instructional task. As a process, this requires the learner to "operate from a paradigm that includes understanding not only the procedures of working with the interface, but also the reasons why these procedures obtain results" (Hillman et al., 1994, p. 32). The results of this study indicated that learners had difficulty accepting the paradigm of satellite distance training. Study participants had no difficulty identifying the benefits of satellite technology for the organization, in terms of reduced training costs, and reaching larger training audiences in less time. However, when asked to consider the personal benefit of participating in satellite training events, learners identified these benefits in terms of what was *taken away* from the learning experience as opposed to what was added to enhance the experience. For example, they cited personal benefits as less time spent in training, less travel to training sites, and less disruption to the learner's daily routine – benefits which closely resonated with benefits identified for the organization. These findings would suggest that learners had difficulty personalizing the rationale for satellite training, which might interfere with their ability to adopt the paradigm of this training technology.

With respect to Roger's (1983, in Graham & Wedman, 1989, pp. 186-187) five attributes that support the adoption of technological innovation, satellite as an instructional technology received high marks from learners for "simplicity," and "trialability" but was found to be lacking in the attributes of "relative advantage," "compatibility" and "observability." In general, satellite was considered a less satisfying learning experience when compared to the

status quo of classroom training. The lack of "eye contact" with the instructor was considered inconsistent with the prevailing values, expectations and needs of learners. In the absence of dedicated site facilitators to oversee training events, participation in satellite training was not regarded by learners to be "observable" to the instructor, and for that matter, to the organization. These study results suggest that organizations need to direct their efforts to addressing perceptions of "relative advantage," "compatibility" and "observability" in order to support learners' adoption of the paradigm of satellite training and thereby enhance learner motivation and satisfaction in such training events.

The learner-interface model proposed by Hillman et al. maintains that the learner must be "literate in the medium's rules of interaction" in order to extract the intended message during the learning transaction. The findings of this study support this view but question the suggestion made by Hillman et al. that learner-interface interaction warrants *equal* treatment by the distance training practitioner as a fourth type of interaction. Recognizing that different media require different mental skills of the learner, the findings of this study suggest that the "high-technology devices" used in satellite-based distance training are user-friendly and are not beyond the capabilities of even novice users. This study found no relationship between learners' experience with the medium of satellite and their need for learner-interface interaction. Therefore, these results challenge the assumption made by Hillman et al. that in satellite networks, comprised of multiple sites that do not have the assistance of on-site coordinators, student orientation to the technology is difficult to achieve (p. 39). Even without the dedicated attention of on-site coordinators, orienting new learners to the Bank's satellite learning system did not appear to be a problem.

The results of this study are consistent with the findings reported by Hillman et al. that

successful learner-interface interaction is highly dependent upon how *comfortable* [italics added] learners feel in working with the delivery technology (p. 32). This study found what Ellis (1992, p. 16) describes as a "very negative – almost technophobic reaction" from learners with respect to some, but not all aspects of satellite communication. Learners reported a high level of comfort using satellite technology in anonymous modes of communication such as responding to electronic questions. However, they reported a definite unease and reluctance in using the handsets to communicate in ways that entail even a remote chance of being identified, such as "call-ins." Technical know-how and understanding of technology protocols were found to be relatively minor factors in determining learners' comfort level in using the various functions of the technology. Learners' comfort level was found to be more powerfully influenced by affective factors such as self-concept, perceptions about the probability of success, and assessment of risks and rewards associated with various interactive activities.

It is recommended that distance training practitioners place greater emphasis on interaction activities that are perceived to entail less risk for the learner such as responding to electronic questions, sending anonymous signals to the instructor using the "Signal" key, and small group discussions at the receiving sites. Also, protocol for interaction activities that learners perceive as entailing higher risk should be examined to identify ways that participation in these activities might be made less threatening. For example, instructors might try identifying callers by site location and handset number rather than by their first name.

Hillman et al. acknowledge that the challenge in giving attention to learner-interface interaction is that "in distance education, the interface itself is unlikely to be relevant to the

subject being studied" (p. 34). Indeed, the results of this study support the view that the technology interface is a "confounding intermediary" between the three types of interaction identified by Moore (p. 34). A negative relationship was found between learner satisfaction and the percentage of time learners spend attending to and interacting with the instructional technology. This suggest that placing too great an emphasis on learner-interface interaction may attract too much attention to the technology itself, which learners may perceive as distraction from their purpose in learning. This study supports Schreiber's (1998b) recommendation that interface interaction should aid communication without attracting attention and energy to itself (p. 52). For example, the frequency of verbal instructions concerning the use of the handsets and communication protocol should be targeted to the experience level of the training audience. Instructors should be prepared to handle incidents of technical communication problems in such a way as to minimize their disruptive effect on the instructional broadcast. Calls to the studio should be screened before they are picked up by the instructor to ensure that there is a clear connection – and to ensure the call is not from a misguided learner who should be calling the "hotline" instead of the on-air instructor, looking for technical support.

One of the most significant findings in this study concerns learners' perception of "interface" to encompass the entire physical learning environment associated with satellite training and not just the technology itself. This would suggest that the construct for "interface-interaction" in satellite distance training is much broader than the definition proposed by Hillman et al. (1994). Just as the medium used to transmit information dictates the means of interaction and "colours the content" (p. 32), so too, conditions at the satellite receiving site appear to influence the quality of interaction and "colour" the learner's

satisfaction with the overall training experience. The results of this study validated findings reported by Graham and Wedman (1989) that an onsite coordinator plays a critical role in a satellite distance training system, at the beginning of a training event and when technical problems occur (p. 189).

It is recommended that those responsible for the planning and implementation of satellite training networks take steps to ensure a consistent level of quality at the receiving sites. For example, site coordinators should be held accountable (through documented job descriptions) for conditions at the site. Performance in this area of accountability should be continually measured through learner feedback obtained in reaction evaluations. Trends of negative feedback at a specific receiving site should be followed up by the organization to determine what corrective action is required (e.g. investment in premises or equipment enhancements, or site relocation).

Learner-Content Interaction

The instructional objectives dictated by the subject matter content are a defining characteristic of the training. The instructional objectives serve to categorize the satellite training into one of three possible types of training applications: information dissemination and knowledge building; critical thinking and technical skill building; or attitude change and motivation enhancement. The results of this study show that the type of training application has an impact on the relative importance and frequency of the four types of interaction. Learners appear to prefer higher levels of learner-content interaction in training applications focused on information dissemination and knowledge building. Conversely, learner-content interaction seems to be regarded as less important in affective types of training applications aimed at changing learners' attitudes.

The challenge in designing learner-content interaction in satellite training is to encourage a process of intellectual interaction with the content which results in changes in the learner's understanding, perspective or cognitive structures (Moore, 1989, p. 2). In other words, learner-content interaction must instruct and not merely inform. However, there is an overriding expectation in converting classroom courses to the satellite medium that cost efficiencies will be realized by reducing instructional delivery time. Therefore, there is a temptation to pack as much content into the time available and use the satellite technology to create *more information;* rather than, to promote clarification and shared understanding of concepts. These findings were also reported by Thach (1995) who notes that the time constraints of the satellite medium which relate directly to the costs of satellite time, also underscore the need for "tighter courses" (p. 107*).* This finding is also evident in Moore's (1989) observation that while the satellite teleconferencing medium is excellent for learner-learner interaction and for some types of learner-instructor interaction, it is frequently misused for instructor presentations that would be more effectively conveyed through print or the recorded media (p. 4).

This study supports Moore's recommendation that, in the time saved by avoiding "content presentations," satellite training could stimulate and facilitate learner-instructor and learner-learner interaction aimed at negotiating a shared meaning of concepts (Moore, 1989, p. 4). Given that learners value interaction as an opportunity to obtain clarification, it is also recommended that distance training practitioners make use of the "Signal" key as a way for learners to send a message to instructors to indicate areas in content where they require clarification. This study also supports Graham and Wedman's (1989) view that the instructional strategy used to convey the subject matter content is a key component of an

effective satellite training experience. Without an instructional strategy, learner-content interaction may be informative, but it will not be instructionally effective (p. 184).

It is recommended that instructional designers focus on ways to promote *didactic* learner-content interaction; what Holmberg (1986) calls the "internal didactic conversation" in which learners 'talk to themselves' about the information and ideas they encounter (in Moore, 1989, p. 2). The findings of this study suggest that one way to achieve this goal is through increased use of electronic questions which engage learner interest, test learner understanding, and provide feedback from an instructor or subject matter expert to clarify concepts. However, to be an effective stimulus for internal didactic conversation, electronic questions must be thought-provoking and focused on clarifying understanding. These questions must address the higher order objectives of "integration," "analysis," and "evaluation" in Bloom's taxonomy and not be used to merely test rote memory; or worse, become only a device to promote interaction for interaction's sake.

Study results suggest that learners perceive relatively little "risk" in responding to electronic questions and participate freely in this type of interactive activity. These findings are consist with Cross's (1988) hypothesis that "low-threat activities serve as entry points for some adult learners" (p. 136). For most learners, electronic questions appear to provide the comfortable "entry point" to interaction in satellite training.

Learners were found to place a very high value on the credibility of the information source; that is, on the credibility of the satellite presenter. Presentation formats consisting of expert panel interviews were rated considerably higher than presentations made by instructors. This suggests that in learner-content interaction, learners prefer satellite-mediated access to a subject matter expert, rather than to an instructor only.

Verbal messages were found to be the most prevalent communication mode for learner-content interaction in satellite training. This finding is consistent with Graham and Wedman's (1989) observation that "one of the common errors in teletraining is to rely too heavily upon the audio channel to deliver the entire instructional message" (p. 190). Hoban, Hoban and Zissman (1937, in Heinich et al., 1996) identified a hierarchy of teaching methods based on their relative degree of abstraction. "Words" are shown as the most abstract teaching method. Results in this study are consistent with findings reported by Hoban et al. that the value of audiovisual materials in education is a function of their degree of realism (p. 16). Visuals such as PowerPoint slides and videos were found to be very important for reinforcing the verbal content messages and helping learners to follow along in satellite training. However, the rich graphical capabilities of the television medium were greatly underutilized since the most commonly used visuals were *text-based* PowerPoint slides. Some studies suggest that visual text symbols are only slightly less abstract than verbal symbols (Dale, 1946, in Heinich et al., 1996, p. 16) thus making satellite training a very complex form of instructional activity. Studies (Schaaf, 1997, in Schreiber, 1998c, p. 403), which indicate that verbal learners respond to voice and text while visual learners respond to pictures and graphics, further suggest that current satellite training practices may put visual learners at a disadvantage. This study supports Graham and Wedman's (1989) recommendation that distance training practitioners need to look for ways to optimize the rich visual capabilities of the television medium through an increased use of less abstract symbol systems such as graphics and video-based audiovisuals (p. 190). This study also supports Graham and Wedman's recommendation that satellite training sessions should be supported with well-designed paper-based satellite session guides (p. 190). Learners

indicated that they valued these materials as a way of making the verbal messages of the training more "concrete," and to help them follow along in satellite presentation. However, session guides should not be so comprehensive that they discourage learner-content interaction through note taking activity; or, make attendance at satellite training events redundant.

In many instances where learners had negative perceptions of the satellite training experience, they reported that the course content did not significantly contribute to their existing level of knowledge; that is, the content was already familiar to these learners. These findings suggest that needs analysis plays a critical role in the design of satellite training, as does a suitably discriminating process for trainee enrolment; one that is based on the individual's identified learning needs and not merely on their job title. These findings support the recommendations proposed in Lawry's (1986) study that, as a first step in the design of satellite training, distance training practitioners should attempt to describe the training audience. In particular, they should consider learners' level of awareness of the subject matter in order to know how "elementary" or "sophisticated" the training should be in the treatment of the topic (p. 92).

The findings concerning the importance of "newness of information" also put into question the use of extensive precourse work that effectively renders satellite training as a "review" of content communicated through text-based self-study guides. These results contradict earlier findings reported by Graham and Wedman (1989) that learners believe satellite training "is appropriate for reviews or updates but not for presenting new content" (p. 184).

The results of this study suggest that in situations where extensive content is most

effectively communicated through precourse self-study guides, the focus of the satellite training should be on learner-instructor and learner-learner interactive activities that clarify meaning, and not on learner-content interaction that reviews content already familiar to learners.

Learner-Instructor Interaction

This study distinguishes between learner-instructor and learner-content interaction in the same way that Moore does – based on the "frequency and intensity of the instructor's influence on learners" (Moore, 1989, p. 3). In this study, the frequency and intensity of the instructor's influence was judged to be greater in activities such as listening to the instructor's questions and formulating a response, and receiving and processing the instructor's feedback. On the other hand, instructor lectures and presentations were categorized as learner-content interaction.

The results of this study found the defining characteristics of learner-instructor interaction to illustrate Holmberg's notion of distance learning as a form of "mediated dialogue" (Holmberg, 1982, in Haughey, 1985, p. 10). The findings validate Haughey's (1985, pp. 10-11) observations that the interjection of technology changes the communication process between instructor and learner in very significant ways (p. 10). Many learners in this study reported interaction with the instructor to be different in tone and quality from what they experienced in the face-to-face instructional environment. They found satellite-mediated communication with the instructor to be more serious, more impersonal, less dynamic and less interesting. The range of learner-instructor interactions were limited; dealing almost entirely with learner-interface instructions or subject matter content. However, instructors were able to generate a variety of learner responses using instructional

strategies such as electronic questions and games.

The percentage of time spent attending to instructor talk was found to vary significantly among the five satellite sessions analyzed in this study. Results suggest that the type of training application has an impact on the level of instructor talk that learners will tolerate, and perhaps even expect during the satellite training. Higher levels of instructor talk were related to higher learner satisfaction ratings in "information dissemination and knowledge building" types of training. Conversely, significantly lower levels of instructor talk were related to higher learner satisfaction ratings in "attitude change and motivation enhancement" types of training. These findings appear to qualify Haughey's (1985) assumption that "students husbanded their time very jealously and preferred to hear the instructor than an unknown fellow student whose comment might well be off topic from their point of view" (p. 10). According to the results of this study, Haughey's statement may hold true for "information dissemination and knowledge building" types of training, but this observation does not appear to apply to "attitude change and motivation enhancement" types of training. In the latter, learners were found to place a particularly high value on learner-learner interaction.

Learner-instructor interactions were student controlled and this was observed to be the most challenging aspect of satellite training for instructors to manage. Findings in this study support Haughey's (1985) argument that while the social conventions of a classroom may obligate students to respond to questions posed by the instructor, learners perceive no such obligation in the satellite training paradigm (p. 10). As Haughey suggests, learners make the final decision to participate by responding to an instructor-posed question. However, the results of this study do not support Haughey's claim that the learner's decision is made

"solely on the quality of the question posed" (p. 10). As reported in Chapter IV, many other factors were found to be more important in contributing to the learner's motivation to participate in interaction, including self-concept, and perceptions of the risks and rewards associated with the mode of interaction.

In general, learners found learner-instructor interaction to be the most disappointing dimension of their satellite learning experience. In describing their interaction with instructors, learners reported a distinct lack of "teacher immediacy" – a construct described by Ellis (1992) to imply that the instructor and learner are accessible to one another through verbal, paralinguistic, visual, and/or physical means (Ellis, 1992, p. 7). Learners described the interaction with the instructor(s) as lacking a "human connection" and being more like "television" in which the presenters are perceived to be "impersonal," not "real," "not there," and "out of touch" with learners' everyday experiences of reality. These findings are consistent with Ellis' (1992) observation that learners view satellite technology as "dehumanizing" (p. 17). Haughey (1985) also found that learners' interaction with satellite instructors is based more on the notion of the instructor as content expert, rather than on that individual's personality and rapport with the class (p. 11). This could explain the importance learners ascribed to "instructor credibility," reported in the findings of this study.

Many learners attributed the perceived lack of instructor immediacy to the limitations of the satellite medium rather than to any lack of skills or competency on the part of the instructor. For example, many interviewees cited the lack of "eye contact" as a definite barrier to establishing an interpersonal connection with the instructor. These findings are consistent with conclusions proposed by Darkenwald and Merriam (1982, in Ellis, 1992) that "the usual practice of transmitting a message [in this case a visual signal] unidirectionally to

an indeterminate audience disregards interaction required by many subjects" (p. 3). Given that one-way video is an unavoidable feature of many corporate satellite networks, it is recommended that instructors make concerted effort to project a personalized image by adopting some of the conventions that help learners relate to the instructor in face-to-face learning environments. These practices include taking time to introduce the instructors and establish their credibility with respect to the subject matter and/or the everyday experience of the learners. As Graham and Wedman (1989) observe, "it is sometimes so easy to get caught up with the technology that the essential elements of good instruction are overlooked" (p. 190).

The results of this study found that learners were more critical of satellite training in which the presenters/instructors were perceived to lack specialized knowledge and/or credible experience. These findings are consistent with Haughey's (1985) observations that learner-instructor interaction is "based on the notion of the instructor as content expert" (p. 11). In situations where the instructor has neither subject matter expertise nor current experience in the topical field of practice, it is recommended that the instructor assume the role of "host" and "interviewer" rather than "instructor." In this event, a subject matter expert(s) who represents a credible level of knowledge and expertise should be added to the presentation panel.

Despite learners' allowances for the limitations of the technology, the instructor's demonstration of certain personal qualities, skills and competencies *were* linked to more positive impressions of learner-instructor interaction. The results of this study found that learners who rated the overall performance of the instructor high also rated their overall satisfaction with the satellite training experience high. These findings are consistent with

Graham and Wedman's (1989) conclusion that "good instruction is critical to the appeal of teletraining" (p. 190). As Haughey (1985) notes, many instructors find it impossible to transfer their classroom behaviour directly to the satellite medium. It should also be remembered that many individuals are attracted to careers as instructors because they are motivated by face-to-face interaction with learners. Therefore, it is recommended that training managers carefully recruit satellite instructors from candidates who both express a zealous interest in the medium and demonstrate the personal qualities that learners identify as highly desirable for effective satellite instruction. These qualities include: "good communicator," "charismatic," "sense of humour" and "enthusiastic." Once recruited, these individuals should be provided with the necessary training and professional development opportunities to support them in developing the specialized skills required for satellite instruction. These recommendations are echoed in Lawry's (986) study of the practice of satellite training in the teaching profession: "choose carefully those persons who will appear on camera, and then work with them so that they become as comfortable as possible with the medium" (p. 94).

Moore (1989) states that in learner-instructor interaction the learner comes under the influence of a professional instructor and is able to draw on the experience of this person to interact with the content in the manner that is most effective for the individual learner (p. 3). However, the conventions of satellite-mediated training do not support an individualized approach to instruction. For one thing, the training is simultaneously delivered to a large geographically dispersed learner population; making it difficult for instructors to address regional differences pertaining to the subject matter content. Also, strict time constraints inhibit instructors' elaboration and spontaneous interjection of anecdotal examples. Moore

(1989) is critical of instruction that is "highly generalized" and "not individual," claiming that it ultimately leaves responsibility for maintaining motivation and interacting with the presentation on the learners themselves (p. 3). The results of this study appear to validate Moore's concerns.

In the current practice of satellite training, learner-instructor interaction is a premeditated component of the instructional design, resulting in the perception that learner-instructor interaction is "formal" and "scripted." Similar observations are also reported by Haughey (1985) who found that the generation of interaction during satellite instruction has to be preplanned as an integral part of the instructional strategy (p. 8). Learner-instructor interaction is "hardwired" into the instructional script and any deviation from the script requires both a high degree of confidence on the part of the instructor, and a high degree of flexibility on the part of studio technicians supporting the live broadcast. In this regard, Ellis (1992) observes that distance training practitioners may be borrowing too indiscriminately from traditional broadcasting practices. He suggests that certain broadcasting production standards may not be necessary within a training environment that requires a different media aesthetic (p. 8). It is therefore recommended that instructors and instructional designers explore techniques to infuse elements of spontaneity and customized delivery that recognize both the personal delivery style of the instructor and the specific interaction needs of the training audience.

Learner-Learner Interaction

In satellite training learner-learner interaction was found to occur in two modes: face-to-face, with learners interacting directly with others at their site; and remotely, with learners interacting with people at other sites through the satellite medium. Learners *consistently*

placed a high value on the importance of interacting with peers and identified the opportunity to interact with others, both face-to-face and remotely, as the single *most* valuable aspect of satellite-mediated training. These results contradict Moore's (1989) assumption that peer-group interaction is an important source of stimulation and motivation for younger learners, but is "not particularly important for most adult and advanced learners who tend to be self-motivated" (p. 5).

Moore (1989) writes that "learner-learner interaction among members of a class or other group is *sometimes* [italics added] an extremely valuable resource for learning and is *sometimes* [italics added] even essential" (p. 3). The results of this study suggest that the "sometimes" Moore alludes to, may be determined by the instructional purpose of the training; since the relationship between learner-learner interaction and learner satisfaction was found to be influenced by the type of training application. Learner-learner interaction appeared to be more important in "attitude change and motivation enhancement" types of training, but less critical in training that focused on "information dissemination and knowledge building"; although, once again, it must be emphasized that learners valued peer interaction in *all* types of satellite training.

Face-to-face interaction increases the variety of interactive activities instructional designers can use to maintain learner engagement and provide an enriched training experience. It also acknowledges the social dimension of learning and allows for peer group support to help learners off-set the more self-directed aspects of satellite training. However, face-to-face learner-learner interaction also introduces a variable to the satellite training experience that neither the instructional designer nor the instructor can control – the influence of one's peers.

Peer reference group attitudes towards various forms of interaction were found to be an important variable in influencing learners' motivation to participate in certain types of interactive activities. Learners appeared to be sensitive to verbal and non-verbal signals from the peer reference group in determining an appropriate level of personal involvement in interaction. In identifying factors that impact learner motivation, Cross (1988) also noted that co-workers served as a strong reference group, observing that "positive attitudes toward education seem to be contagious; individuals catch the interest from others around them" (p. 139). Graham and Wedman (1989) observe that the opposite is also true – that those who have negative attitudes towards satellite training tend to share that negative perception with others; thereby, slowing the acceptance of the instructional technology (p. 190).

Group dynamics among learners at the satellite receiving sites is one area of learner-learner interaction that receives little or no attention in the literature. However, in this study, learners' perceptions of group dynamics were found to have important implications for their overall level of "comfort" and satisfaction with the training experience.

Learners identified an affective need to "feel connected" to others and indicated that opportunities for professional networking were an important part of the corporate training experience; however, similar findings were *not* found in studies of instructional satellite reported by Haughey (1985), Lawry (1986), Graham and Wedman (1989), or Fulford and Zhang (1993). Although satellite training offers the potential for interpersonal interaction, many learners found limited opportunity to get to know others at their site. Some learners reported that the first few minutes upon arrival at a receiving site felt uncomfortable because they found it awkward to take the initiative in meeting new people. Many learners also reported that due to time restrictions, there was insufficient opportunity to get to know others

during small group discussion exercises. Limited opportunity to interact with others was particularly evident in sessions that did not allow for any "unstructured" interaction time, such as breaks in the broadcast. The results of this study confirm findings reported by Graham and Wedman (1989) that some learners characterize satellite learning as an "isolating" and "impersonal" experience, similar to being "in a large lecture class" (p. 189). This study supports Graham and Wedman's recommendation that distance education practitioners should place greater emphasis on instructional activities designed to establish rapport and a sense of belonging among participants at the receiving sites (p. 189). For example, rapport building activities might include a "climate setting" exercise at the beginning of the broadcast as a way to encourage learners to introduce themselves to one another. In addition, it is suggested that a small portion of satellite training time be set aside for "unstructured" learner-learner interaction through scheduled breaks.

Graham and Wedman (1989) also recommend that distance training practitioners seek ways to increase two-way interaction between training participants at different sites. They suggest networking across receiving sites by managing the question and answer process. For example, when a learner asks an application-based question, rather than answering the question, the instructor can ask for suggestions from participants at other sites (p. 188).

The results of this study give emphasis to Moore's (1989) statement that learner-learner interaction "poses the greatest challenge to our current thinking and practice in distance education" (p. 3). While face-to-face peer contact increases the instructional possibilities for interaction, it also presents its fair share of challenges. A recurrent theme in this study shows that learners who were distracted, were themselves, distracting to others. For example, the occurrence and impact of "side-talk" among learners at the receiving sites presented a

formidable obstacle to other types of interaction. This was particularly evident in locations where "side-talk" resulted in a level of "noise" that made it difficult for people to attend to the satellite presentation on the TV monitors. Many learners explained the occurrence of "side-talk" as a response to learners' intense and immediate needs for work-related information. In these situations, "side-talk" was perceived to have value as an informal and unintended by-product of the satellite training. In all cases, however, learners identified "side-talk" as a distracting element that undermined the intended objectives of the satellite training. The problem of "side-talk" seemed to be exacerbated in situations where individuals were identified to participate in training based on job title and not on a personal need to learn the subject matter content. Perceiving little or no personal need for the training, these individuals reported little motivation in attending to the instructional activities of the satellite training. Some learners attributed the high incidence of "side-talk" to the fact that the organization was experiencing a high degree of workplace transition. Others attributed this distraction to the lack of learner protocol and a lack of oversight at the remote location, reporting that "side-talk" was less of a problem at sites where members of management were in attendance.

In addressing the problem of "side-talk," this study makes two recommendations. First, distance education practitioners should openly acknowledge the tendency for learners to engage in "side-talk" and overtly address this issue when reviewing learner protocol necessary for effective satellite learning. In this way, perhaps the peer pressure implicit in a clearly defined learner protocol will, to some extent, discourage this distracting behaviour. Secondly, this study recognizes that in one-way video, two-way audio satellite systems, the instructor has no visual contact with learners at the receiving sites. Consequently, the

instructor has no way of knowing if learners are attending to the lecture, staying on task during small group exercises, or even if the learners have left the training site part way through the broadcast. Therefore, this study recommends the appointment of a site facilitator to oversee instructional activities at the receiving site as a way of reinforcing learner protocol, discouraging "side-talk" and supporting learner participation in all forms of interaction. The site facilitator does not necessarily have to be a dedicated trainer. A manager, or other participant who is prepared to assume a leadership role at the site, may fulfil the site facilitator function without incurring additional overhead costs for the satellite learning system. The recommendation to appoint a site facilitator to oversee instructional processes at the receiving site, is consistent with Fidishun's (2001) observation that "those learners who are new to adult education or who for some reason have not experienced the ability to be self-directed learners in the past, need a structure which will help them to grow" (p. 2).

One rather unexpected finding in this study was the fact that learners perceive "call-in" communication with the instructor as a form of learner-learner interaction; not, as one might expect, learner-instructor interaction. The reason for this perception was that learners regarded speaking "on air" as a very public form of communication directed at the broader trainee audience. This finding appears to contradict Moore's (1989, p. 2) description of the types of communication that constitute learner-instructor interaction. However these study results are supported by similar findings reported by Haughey (1985):

> The medium of television further emphasizes the notion that the speaker is directing his comments at the viewer alone yet the anonymity of the system is such that a general request for student calls is not likely to generate any response. In such a situation, the student caller is aware that his comments are audible to all his fellow-students and he has little information about their

> attitudes and level of expertise...without group support, many students hesitate to ask what might be considered a naïve question (p. 11).

Generally speaking, there appears to be a relationship between the number of "call-in" questions learners are disposed to direct to instructors and subject matter experts and their level of satisfaction with the satellite training. Furthermore, to the extent that questions posed by peers were relevant and represented their own queries, learners ascribed value to these questions as a form of vicarious interaction. These results are consistent with findings reported by Fulford and Zhang (1993) that overall dynamics in interaction may have a stronger impact on learner satisfaction than does strictly personal participation in interactive activities (p. 8). By increasing learners' perceived level of overall interaction, vicarious interaction may result in greater learner satisfaction (p. 17). This study supports Lawry's (1986) recommendation that the satellite training should allow for the "call-in" interaction at several points during the broadcast and that calls should be screened to ensure that they are relevant (p. 95).

As reported in Chapter IV, this study identified a number of factors that discourage learners' participation in "call-in" interaction. The most notable deterrent was the fear of publicly speaking before an indeterminate (but presumed to be large) audience. A significant finding in this study shows that learners consistently overestimated the actual size of the satellite session audience to include several hundred, and even several thousand participants. As a result of this misperception, some learners expressed a definite reluctance to interact through "call-ins" that might potentially be heard by a vast trainee audience. Some also described the career risk they perceived in not knowing who in the organization might overhear their "on air" comments or questions. Hillman et al. (1994) also report that new users, in particular, are often "fearful" about using an instructional technology (p. 33); but

while these authors attribute this fear to dimensions of learner-interface with the technology, the results of this study suggest that this fear arises more from individuals' perceptions of learner-learner interaction.

This study makes a number of recommendations intended to diminish learners' perceptions of risk associated with "call-in" interaction activities. It is recommended that distance training practitioners:

1. Avoid describing the satellite medium in terms of an instructional technology of "mass training." They should also downplay the satellite medium's capacity for reaching a large audience and, instead, and focus, instead, on its merits as an *individualized* form of instruction by emphasizing satellite's benefits in terms of providing just-in time training with greater convenience for the individual.
2. Clearly state the number of learners that *are* tuning into the satellite broadcast.
3. Identify those elements of "call-in" interaction which learners perceive to entail risk. Practices should then be put into place to eliminate such elements; thereby, diminishing the perceived level of risk. For example, instructors should avoid identifying callers by their first name.
4. Appoint site facilitators who can offer to place the calls and the read questions or comments on behalf of learners at the site.

A Proposed Theoretical Model for Understanding Learner Motivation in Satellite-based Corporate Distance Training

The process of comparative analysis applied in this study can be used to generate two kinds of theory: substantive and formal. Glaser and Strauss (1967) define formal theory as theory that is developed for a conceptual area of social inquiry such as "interaction" and

"motivation." Substantive theory is developed for an empirical area of inquiry, such as "corporate training." This study, which examines interaction and learner motivation in satellite-based corporate distance training, falls somewhere between the formal "grand theories" of interaction and motivation and what Glaser and Strauss (1967) describe as the "minor working hypotheses of everyday life" (p. 32).

The *Delta Model* (see Figure 8), described in this section, emerged from the empirical findings of this study, as a theoretical framework that might guide distance training professionals in designing interactivity in satellite-based corporate training. In developing this model to explain the complex and competing forces at work in motivating learners to participate in interactive activities, I compared the current research findings reported in Chapter IV to past theoretical models found in the literature. The resultant framework is a modification of earlier theoretical models put forth by Kjell Rubenson (1977, in Cross 1988, pp. 115-119) and K. Patricia Cross (Cross, 1988, pp. 124-131).

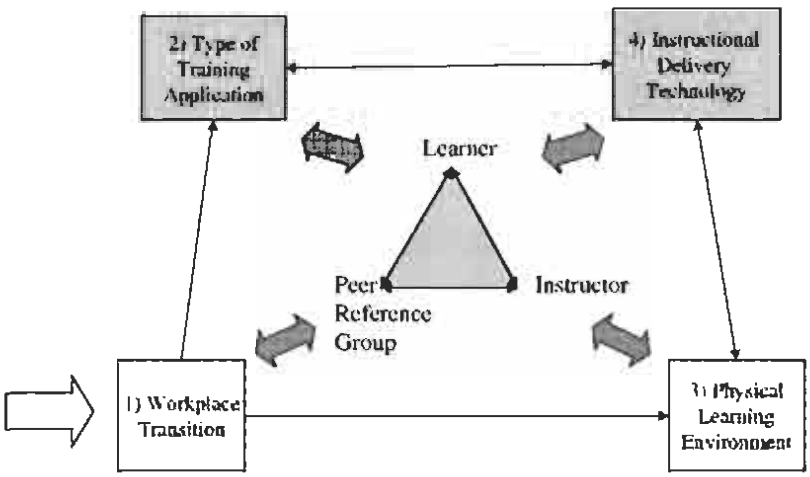
The *Delta Model* is based on two key assumptions, which are supported in the findings of this study:

1. Learner participation in interactive activities is a *voluntary* process; and,
2. Learner motivation and interaction are "designed conceptual systems" which occur within the "purposive human activity system" described as corporate training (Banathy, 1992, p. 12).

Social systems have intensive interactions with their environment that result in changing goals and ways of doing things (Banathy, 1992, p. 6). Corporate training, as a social system unique to its environment, is qualitatively different from other educational systems. Therefore, the designed conceptual system of learner motivation depicted in this model is

unique to the social system defined as "corporate training."

Figure 8. The Delta Model: Learner Motivation for Interaction in Satellite-based Corporate Distance Training



The *Delta Model* integrates Rubenson's view that learner motivation is the net result of positive and negative forces working within the individual and within the environment, as the individual perceives and experiences it. It recognizes that learner motivation is determined by the individual's expectations of personal success in participating in an interactive activities; as well as, perceptions of the positive and negative consequences of participation. Similar to Cross's conceptual framework, the *Delta Model* seeks to identify the relevant variables in learners' motivation to participate in learning activities, and to hypothesize their possible interrelationships.

The *Delta Model* attempts to explain learners' motivation in interaction as a *reciprocal relationship* between multiple and diverse components that comprise the satellite corporate learning system. These components include the learner, the instructor, the peer reference

group, the instructional delivery technology, the physical learning environment, and the corporate culture of the organization providing the training. The model incorporates an Instructional Systems Development (ISD) perspective to explain the role and relationship of these components in learner motivation. It situates learner motivation within an organizational context that is delineated by four factors, largely determined by the corporate entity. These factors are described in the following sections.

Workplace Transition

Learners' participation in satellite interaction does not occur in a vacuum; but rather, it is situated within the broader context of the organizational environment. In this model, learners' motivation to participate begins at the point of Workplace Transition. This term is used to describe a defined period of change and adjustment that occurs within a organization as a result of implementing new policies and procedures. Of the four organizational factors, Workplace Transition is the most important because it is the catalyst which instigates the organization's satellite training intervention, thus setting the stage for learner interaction. The nature of the Workplace Transition determines the instructional objectives of the training, and consequently, the type of training application that will be developed. There is a direct relationship between the impact of Workplace Transition on individuals and their perceived need for interaction, particularly learner-content interaction. Workplace Transition must be significant enough to trigger a need for information in the individual, thus creating a "teachable moment"; however, it must not be so excessive that it undermines the individual's interest and attention during the training event. Workplace Transition also impacts the quality of the physical learning environment. For example, periods of intense change within the organization can lead to neglect of the satellite receiving sites and disruptions to equipment

installations.

Type of Training Application

As previously stated, the nature of the Workplace Transition determines the type of training application the organization will use to achieve its business objectives. Workplace Transition that entails new products and services will result in "knowledge dissemination" training; changes in procedures will call for "critical thinking and technical skill building" applications; and, changes in organization policies and values will necessitate training aimed at "attitude change and motivation enhancement." The type of training application determines the instructional design and therefore the interaction profile of the satellite training event. Also, learners' needs and preferences for the frequency of different types of interaction appear to be influenced by the type of training application. For example, a higher frequency of learner-content interaction is linked to learner satisfaction in "knowledge dissemination" training; a higher frequency of learner-learner interaction is linked to satisfaction in affective training.

Physical Learning Environment

Physical conditions at the satellite receiving site influence learners' satisfaction in the training experience and their readiness to participate in interactive activities. On the other hand, periods of intensive Workplace Transition can distract site coordinators from attending to responsibilities at the receiving sites, disrupt satellite equipment, and cause over-crowding at the sites due to an increased demand for training. Uncomfortable or inadequate conditions at the receiving sites can distract learners' attention from participating in interactive activities.

Instructional Delivery Technology

The instructional design and the features of the satellite learning system that the organization employs to deliver the training, create both opportunities and barriers for interaction. The instructional design must incorporate interaction opportunities and the satellite learning system must be technically capable of supporting interaction. The type of training application determines the instructional design, since different training applications appear to be characterized by different interaction profiles. Likewise the features and capabilities of the satellite learning system determine the types of training applications that can be delivered.

Similar to Cross's (1988) conceptual framework, The *Delta Model* assumes that learner participation in interactive activities is "not a single act but the result of a chain of responses, each based on an evaluation of the position of the individual in his or her environment" (p. 125). Within the "climate" created by the organizational context, learner motivation occurs as a continual feedback system or "trialogue" between three stakeholders: the Learner, the Instructor and the Peer Reference Group. Each of these stakeholders influences and is influenced by the organizational context of the training:

Learner

The learner's self-concept, values, perceived learning needs, attitudes towards the training message, and perceptions of risks and rewards associated with the various types of interactive activities influence personal motivation to participate in interaction. The individual's perceptions of the instructor's personal skills and qualities as well as the attitudes and values reflected in the conduct of the peer reference group also impact learner motivation.

Instructor

The instructor's overall performance is related to learner satisfaction, which in turn impacts the learner's readiness to participate in interaction. In particular, individual perceptions about the instructor's personal qualities, skills, and credibility appear to have an impact on learner readiness to attend to the training message and engage in interactive activities. The relationship between instructor, learner and peer reference group appears to be reciprocal in that the instructor's overall performance is also influenced by learners' readiness to cooperate in interactive activities; both individually and collectively. For example, a lack of purposive interaction in small group discussion exercises, or a reluctance to call in during "question and answer" segments, results in awkward periods of silence as instructors attempt to cajole learners to "call-in."

Peer Reference Group

Other people at the receiving site and at other receiving sites are more than just a collective of "learners"; due to their degree of impact and influence over the individual's perceptions and behaviour, other learners comprise a "peer reference group." Perceptions about the attitudes and values of the peer reference group appear to influence the individual's motivation to engage in various types of interactive activities. The conduct and behaviour of the peer reference group can support or detract from opportunities for the individual to interact (i.e. "side-talk" can make it difficult for the learner to hear the monitor). Likewise, the values and conduct of the individual learner can also impact the norms of the peer reference group in situations where the individual assumes a peer-mentor or leadership role.

deCharms and Muir (1978) argue that, "the problem for motivation is to understand the determinants of change in the stream of action, not to find what drives impel specific

behaviours"(in Cross, 1988, p. 125). Consequently, the centre of the learner motivation system represented by the *Delta Model* is the "delta" (Δ) symbol; a reminder that learner motivation is a temporal value. It is continually changing, as learners become more experienced and comfortable with the technology, and as the company matures in its organizational capability for using technology to support distance learning. However, it must not be assumed that changes in learner motivation are unidirectional, always moving towards improvement. According to Rubenson (1977, in Cross, 1988), the strength of learner motivation is determined by the fluctuation between positive and negative forces working within the individual and the environment (p. 115). For example, while some studies show that learners' comfort level with the technology increases with exposure to satellite training (Ellis, 1992, p. 16), other studies predict that perceived levels of interaction and satisfaction with this form of training *decline* with increased exposure (Fulford & Zhang, 1993, p. 8).

Furthermore, as an open system, learner motivation is vulnerable to destabilizing influences in the organizational environment. For example, periods of high workplace transition, such as a merger, can lead to an increase in employees' level of stress and anxiety; this, in turn, can have a negative impact on their risk-tolerance for participating in certain types of interactive activities, such as "call-ins."

Applying the Grounded Theory

Glaser and Strauss (1967) emphasize that grounded theory must be applicable *in* situations as well as *to* them (p. 249). In other words, a theory is developed not only to provide scholarly insight into an area of study, but also to facilitate its application in daily situations, by a discipline's practitioners (p. 237). The following is intended to demonstrate the practical application of the *Delta Model* as a grounded theory, with respect to these four

highly interrelated properties identified by Glaser and Strauss (1967):

1. **Fit** – The *Delta Model* closely fits the substantive area of one-way video, two-way audio satellite-based corporate distance training, for which it was intended, by providing concepts and hypotheses that fit the everyday realities of distance training practitioners, who are expected to apply this theory. To meet the criteria of "fit," the theory has been carefully *induced* from the diverse data which describe the everyday realities of the substantive area;
2. **Understandable** – The theory has been shared with colleagues working in the substantive area. They have found this theory to be an understandable and plausible explanation of the forces that influence the phenomenon of learner interaction in one-way video, two-way audio satellite-based corporate distance training. This understanding is crucial since it prepares these practitioners for applying the theory in order to improve the quality of interaction that is possible in satellite training.
3. **General** – the *Delta Model* is sufficiently general to be applicable to a multitude of diverse daily situations within the substantive area of satellite-based corporate training; not just the case of practice described in this study. Concepts presented here are not so abstract as to lose their "sensitizing aspect"; yet they are abstract enough to make the theory a "general guide to multi-conditional, ever-changing daily situations" (Glaser & Strauss, 1967, p. 242); and
4. **Control** – In identifying the variables and forces that influence learners' perception of interaction, and their motivation to participate in various interactive activities, the *Delta Model* allows the user control over the structure and processes of satellite training; making its application worth trying. The distance training practitioner can use the theory

to "understand and analyze ongoing situational realities, to produce and predict change in them, and to predict and control consequences both for the object of change and for other parts of the total situation that will be affected" (Glaser & Strauss, 1967, p. 245). For Glaser and Strauss, the crux of "control" is the production and control of change through the control of identified variables (p. 245).

Recommendations for Future Inquiry

This study's focus on learners' experiences and perceptions of satellite-based corporate distance training in one case of practice, a major Canadian bank, limits the generalizability of its findings to the universe of all satellite learners and satellite learning systems. However, the case study approach does permit generalization to theoretical propositions (Yin, 1984, in Lawry, 1986, p. 89). The theoretical propositions regarding possible variables and their dynamic interrelationship are expressed in terms of nine questions which are intended to guide future inquiry into the social phenomenon of learner interaction in one-way video, two-way audio satellite-based corporate training.

1. Does real-time interaction make a valuable contribution to learners' satellite training experience that offsets the restrictions of time and place dictated by synchronous interaction?
2. Is learner participation in interactive activities during one-way video, two-way audio satellite corporate training voluntary and learner-controlled?
3. Is learner motivation to participate in satellite-based corporate distance training directly related to the individual's perceptions of workplace transition and perceived need for information?

4. Do learners perceive a lack of instructor immediacy in one-way video, two-way audio satellite training?
5. Do learners value learner-learner interaction and do they have an affective need to feel "connected" to their peers; if so, can peer attitudes and behaviour encourage and/or discourage individual participation in interactive activities?
6. Is Learner motivation to participate in various forms of interaction influenced by the attitudes, values and behaviours of the peer reference group?
7. Do learners' perceptions of learner-interface interaction encompass interaction with the total instructional environment; not just interaction with the technology?
8. Do learners perceive varying levels of personal risk associated with participating in various types of interactive activities; if so, are they more likely to participate in interaction perceived as low-risk and less likely to participate in interaction which they perceive to entail high-risk?
9. Are different types of training applications characterized by different interaction profiles; if so, does the type of training application have an impact on learners' need for various types of interaction?

Conclusion

Bretz (1983, in Ellis, 1992) states there are two general goals pursued by those applying satellite technology to corporate distance training: "to stimulate, within the limitations of the medium, the experience of face-to-face communication; and, to go beyond the possibilities of face-to-face meetings and develop new kinds of dimensions of communication" (p. 7). The conclusions of this study urge distance training practitioners to do the latter. Satellite technology is not a substitute for face-to-face communication and to work from a design and

delivery paradigm that encourages such comparisons is to bring attention to the limitations of the technology; especially as these apply to learner-instructor interaction. As long as learners perceive satellite-based instruction to be "less than" the status quo of classroom training, they will be reluctant to fully commit themselves to the adoption of this instructional technology (Rogers, 1983, in Graham & Wedman, 1989, pp. 186-187). Instead, distance training practitioners should focus on using technology in ways that go beyond the possibilities of face-to-face instruction; such as, providing greater access to subject matter experts, and engaging learners in individualized and overt interaction through electronic questions. The future of this instructional technology lies in our ability to design and deliver training in a way that optimizes satellite's potential as a rich medium for learning – and interaction. The evident commitment of corporate trainers to the principles of continual improvement and innovation in this regard, suggests that this future is within our grasp.

The provision for face-to-face communication in learner-learner interaction introduces a dimension to satellite training that is uncommon in distance training. As Moore (1989) aptly points out, learner-learner interaction "poses the greatest challenge to our current thinking and practice in distance education" (p. 3). Only by understanding the unique group dynamics that colour satellite training, can we hope to influence the factors and circumstances that impact the quality of the learning experience. My purpose in this study was to convey to colleagues and distance training practitioners the credibility of the discovered framework which, as a systematic theory, I am confident forms a reasonably accurate statement of the social phenomenon of interaction in one-way video, two-way audio satellite-based corporate training. However, this conviction does not mean to imply that my analysis is the only plausible interpretation of the data; only that it represents a systematic ordering of concepts

into an integrated theory.

As this study shows, interaction is not a dispassionate learner activity that takes place in a vacuum of *ceteris paribus* conditions; rather, it is a value-laden activity that occurs within a complex social context, which in this case is defined as the corporate workplace. To understand interaction in satellite-based corporate training, one must understand its relationship to this context. And finally, it is important to acknowledge Graham & Wedman's (1989) observation that while learner satisfaction in satellite training is a significant issue, "it is less important than issues of effectiveness, efficiency and affordability" (p. 183). This is especially true in the context of corporate distance training where recommendations for improving interaction must not only be instructionally sound, they must also make good business sense.

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APPENDIX A

INTERVIEW QUESTIONS

Question #1	What past experience have you had with satellite training? (i.e., approximately how any programs have you participated in as a learner?)
Question #2:	What was the last satellite training session you attended and when did you attend?
Question #3	Why do you think satellite was used to provide this training?
Question #4	What were the benefits, if any, of attending a satellite program versus a) attending conventional classroom training? b) receiving a self-study guide?
Question # 5	Tell me about the site where you attended the training. For example: How far did you have to travel? How was the room arranged? What was the equipment like (e.g., size of TV monitor)? Was someone there to greet you, set up equipment, hand out program materials?
Question: #6	How far away were you seated from the TV monitor?
Question #7	How well did you understand what would be expected of you during the satellite training session?
Question #8	How comfortable did you feel using the handset to: Log in Respond to multiple choice, true/false questions Call-in with a question or comment Signal the instructor

Question #9	Did you or anyone at your site experience any technical difficulties during the satellite broadcast? If yes, please describe what happened.
Question #10	How much of the content in that satellite session do you feel was of value to you? (i.e., how relevant was this satellite training to your job performance?)
Question #11	How would you rate your knowledge of the content before and after the satellite training?
Question #12	Did you take notes during the satellite session? If so, how often?
Question #13	How often did you respond to electronic (i.e., multiple choice, true/false) questions posed by the instructor?
Question # 14	To what extent did the electronic questions contribute to your overall interest level during the training?
Question # 15	To what extent did the visual slides (and videos, if applicable) contribute to your interest level during the training.
Question #16	What, in your opinion, are the attributes and characteristics of an effective instructor?
Question #17	To what extent do you feel the satellite instructor(s) met your expectations of an effective instructor?
Question #18	To what extent did the instructor gain and maintain your interest? (e.g., by directing your attention to important aspects of the content?)
Question #19	How often did you call-in to volunteer an opinion or ask a question?
Question #20	What factors may have prevented or encouraged you to do so?
Question # 21	To what extent did the Question & Answer segment(s) contribute to your interest level?
Question #22	What percentage of the time, would you say, did the instructor spend interacting with participants, versus presenting content?
Question #23	What can you tell me about the instructor? (i.e., how well did you get to know him/her as an individual?)

Question #24	How well did you get to know the other participants at your site?
Question #25	How important is it for you to be able to "connect" with other participants during training sessions?
Question #26	Do you feel that there was sufficient opportunity to get to know participants at your site? At other sites?
Question #27	To what extent did small group discussion activities contribute to your interest level?
Question #28	To what extent did hearing from participants at other sites contribute to your interest level?
Question #29	To what extent did you participate in group discussion exercises (e.g., were you ever nominated spokesperson for your group)?
Question #30	Would you like to see more or less small group activities in future satellite training sessions?
Question #31	When you consider the type and frequency of interaction that you experienced, how satisfied are you with the overall level of interaction in this satellite training session?
Question #32	How would you rate your overall satisfaction with this satellite training session?
Question #33	What, in your opinion, might improve the quality of satellite training sessions?
Question #34	How would you feel about participating in future satellite training sessions?