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FACULTY ATTITUDES TOWARD INTERACTIONS IN DELIVERING

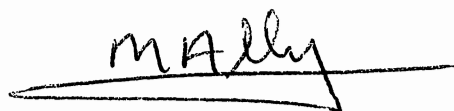UNDERGRADUATE DISTANCE EDUCATION

BY

JANICE KATHLEEN THIESSEN

A thesis submitted to the

Athabasca University Governing Council in partial fulfilment

of the requirements for the degree of

MASTER OF DISTANCE EDUCATION

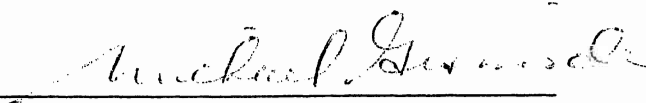Athabasca, Alberta

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The undersigned certify that they have read and recommend to the Athabasca University

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INTERACTIONS IN DELIVERING UNDERGRADUATE DISTANCE EDUCATION"

submitted by JANICE KATHLEEN THIESSEN 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, Jim Fader, and our children, Matt, Susan, Claire and

Miles, whose generous love and patience encouraged and sustained me throughout this

program. By example, my parents, Lillian and Peter Thiessen instilled in me a love of

learning, and esteem for education. I hope my children too will inherit and cherish these gifts.

ABSTRACT

Interaction is a common theme in distance education. While distance learners, and the uses of various technologies and tools, have been studied extensively, faculty have received less attention in the literature. The purpose of this study was to determine practitioners' attitudes toward interaction in undergraduate education at a distance, as well as how these attitudes and outlooks are demonstrated in practice. This study used a mail survey of faculty who deliver undergraduate education at a dedicated distance university, regarding their attitudes and actions in relation to learner-instructor, learner-content, learner-interface and learner-learner interactions. The resulting data was analysed to provide descriptive statistics as well as explore possible correlations between how frequently faculty use various approaches to interaction, how satisfied they are with these approaches, and how important they feel the approaches are to helping learning happen. Learner-instructor, learner-content and learner-interface interactions are valued highly. Learner-learner interaction is valued just moderately. In practice, faculty provide for all four types of interaction. Learner-instructor interaction receives the most attention, with learner-learner interaction attended to somewhat less. For all four types of interaction, there are positive correlations between how frequently faculty use approaches, and both their satisfaction with these approaches and their perceptions of how important these approaches are to helping learning happen. The strongest of these correlations involve online approaches such as electronic mail and multimedia presented on the Internet. Two major issues remain to be addressed. The first is whether the attitudes and actions of Athabasca University tutors regarding the four types of interaction are comparable to those of the faculty who teach undergraduate courses. The second is whether faculty at dual-mode distance universities, or those who deliver group-paced instruction to students

organized into classes and cohorts, have attitudes and behaviour regarding interaction that are

similar to or different from the faculty in this study.

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CHAPTER I

INTRODUCTION

Statement of the Problem

Interaction is a key concept in distance education (Hillman, Willis & Gunawardena, 1994; Holmberg, 1986; Saba, 2000). Holmberg (1986) writes that between students, and course authors and tutors, "there is constant interaction…[both] simulated through the students' interaction with pre-produced courses and real through…interaction with their tutors" (p. 55). According to Hillman et al., "the importance of interaction in education is practically a 'given'" (p. 31). Saba (2000), in a review of distance education research, states that the concept of interaction is "a common theme in distance education research…[and central] in conceptualizing the process of teaching and learning" (p. 4).

Moore (1989) distinguished between three types of interaction in distance education; (a) learner-instructor, (b) learner-content, and (c) learner-learner. Interaction as a construct in distance education was developed further by Hillman et al. (1994) who noted that "Moore's (1989) three types of interaction do not account for all of the interactions in today's educational environment" (p. 39). They proposed "the conceptualization of an additional type of interaction: learner-interface interaction" (p. 39).

A fundamental element in defining distance education is the separation of the teacher and learner (Keegan, 1990), and distance educators are therefore challenged to provide for the multiple types of interaction. According to Wagner (1997) critics often cite interaction "as the missing ingredient" (p. 19) in distance education. While technology of some sort is used to "mediate the necessary two-way communication" (Shale & Garrison, 1990, p. 25) it

is also the case that "the issues of designing instruction at a distance are complex, given the range of existing and emerging technologies" (Garrison & Shale, 1990, p. 123). This complexity is increasing, now that the "tremendous surge in online communication" has resulted in "rapid growth of technology-mediated distance learning at the higher education level" (Institute for Higher Education Policy, 2000, p. 5).

<div align="center">Significance of the Study</div>

This study of the delivery of undergraduate education at a distance was intended to contribute to a better understanding of how distance educators provide for and facilitate various types of interaction. In so doing, it provides the sorts of information which will address the research challenge posed by Beaudoin (1991), that of "providing bases for greater common understanding among individuals and organizations engaged in distance education activities" (p. 1). In addition, little has been published about distance educators' attitudes toward interaction, or how those attitudes may be manifested in their practice. For those distance educators seeking to understand the role of interaction in distance education and enhance their own practice, knowledge about various approaches that provide for and facilitate interaction, and how these practices reflect principles of good practice, may be of considerable value. With such knowledge, it is possible that planning or other interventions could improve the efficacy of both more traditional forms of distance education as well as newer online, distance delivery methods. Since developments in online and other technologies are expected to further impact upon interaction and the process of learning at a distance, new knowledge in this area is of major significance.

In order to achieve the purpose of contributing to a better understanding of how distance educators provide for and facilitate various types of interaction, this study had two broad objectives. The first objective was to determine practitioners' attitudes toward interaction in undergraduate education at a distance. The second objective was to determine how these attitudes and outlooks are demonstrated in practice. In this study, the construct of interaction was used as a framework to investigate and illustrate a particular cross-disciplinary case of practice in delivering education at a distance through various delivery methods. The case of practice examined in this study was undergraduate education at Athabasca University (AU), which is a dedicated distance education university.

Research Questions

In order to achieve its stated purpose, this study examined the following three general research questions:

1. What are the attitudes of Athabasca University faculty toward interaction as a component of distance education practice?

2. Do Athabasca University faculty provide for interaction in their practice, and if so, what tools, processes and activities (approaches) do they employ in order to provide for and facilitate different types of interaction as they deliver undergraduate education at a distance?

3. Are there associations between how frequently approaches are used, how satisfied faculty are with their use of these approaches and how important faculty believe the approaches are to student learning?

These main research questions were designed to achieve the purpose of describing a particular case of distance education practice in terms of faculty attitudes and action regarding interaction. Though the results of this study may not be generalizable beyond the case examined, in order to broaden the scope beyond the particular context of Athabasca University, this study compared the description of interaction in practice at Athabasca University to principles of good practice from the literature.

<center>Definitions of Terms</center>

The following terms were operationally defined for this study:

- **Undergraduate education at a distance**: Educational activity leading to a university certificate or baccalaureate degree in which student(s) and teacher are separated by physical distance and/or time, and the instructional gap is bridged by some form of technology (e.g., audio, video, computer, print, etc.).

- **Faculty**: A professional instructor teaching undergraduate education at a University, described as professor, associate professor or assistant professor.

- **Teaching practice**: Specific action that constitutes actual performance or application of teaching.

- **Principles**: Comprehensive and fundamental beliefs or values which act as guidelines for action.

- **Distance education approaches**: Specific tools (e.g., communication methods) and/or processes (e.g., learning activities, teaching strategies) employed or facilitated by faculty and intended to produce a desired effect or result.

- **Learner-content interaction**: The "process of intellectually interacting with content that results in changes of the learner's understanding…perspective or cognitive structures of the learner's mind" (Moore, 1989, p. 2).

- **Learner-instructor interaction**: "Interaction between the learner and the expert who prepared the subject material or some other expert acting as instructor" (Moore, 1989, p. 3) for purposes of motivating learners, presenting information, organising application of what is being learned, and evaluation to determine if learners are making progress.

- **Learner-learner interaction**: "Inter-learner interaction, between one learner and other learners, alone or in groups, with or without the …presence of an instructor" (Moore, 1989, p. 4).

- **Learner-interface interaction**: Interaction between the learner and a "technological medium in order to interact with the content, instructor or other learners" (Hillman et al., 1994, p. 33).

- **E-mail (electronic mail)**: Messages, usually text, composed electronically with special software and transmitted through a computer network from one computer terminal or system to another.

- **Postal mail**: A method for shipping text documents and learning materials via a postal service; often referred to as surface mail.

- **Print study guide**: A print document provided to students, and containing specific information about particular course components, such as schedules, exam study questions, advice for selecting essay topics, and so forth.

- **Print student manual**: A print document provided to students, and containing general information about a course, course contracts and evaluation, as well as advice and contact information for resources such as tutors, library services, and so forth.

- **Multimedia on CD-ROM**: Presentation of integrated multiple media (e.g., text, graphics, video, audio, animation, etc.) on a compact disc in read only format.

- **Multimedia on the Internet**: Presentation of integrated multiple media (e.g., text, graphics, video, audio, animation, etc.) on Internet sites and pages.

- **Online bulletin board**: A program on a computer system that allows users to read and write public notices, usually available on the Internet and accessed by personal computers and modems.

- **Asynchronous computer conference**: Members of a group use personal computers and modems to connect to a central host computer and engage in a (usually facilitated/moderated) discussion by posting questions and comments to a bulletin board type of system.

<u>Delimitations</u>

In order to encompass both the design and delivery of education at a distance, the group of potential subjects for this study was a census of faculty and did not include Athabasca University tutors.

This study was further delimited to undergraduate faculty at Athabasca University. There are distinct differences between undergraduate and graduate level instruction at Athabasca University, including different content, different academic expectations, and different approaches to program delivery. Usually, undergraduate students at Athabasca University are not organised into cohorts, and undergraduate instruction is self-paced; this is

not the case for students of graduate programs. In addition, the academic centres providing graduate level instruction at AU are funded differently than undergraduate programs (through cost-recovery as opposed to base funding). Finally, providing graduate level instruction is a relatively new development at Athabasca University, compared to undergraduate courses that have been provided for over 30 years.

Limitations

Because participants in this study were contacted as part of a census, the results of this study are not representative of the population of practitioners in the field of distance education. In addition, the findings are related to a higher education setting and may not be generalizable to other sorts of distance education activity, such as that in the public school system or private sector.

This study considered the role of faculty in both design/development and delivery phases of instruction. While the duties of Athabasca University tutors, in their role of delivering undergraduate education at a distance, are similar to those of faculty in this role, the results of this study may not be generalizable to the work of tutors.

Assumptions

The assumptions behind this study deal with the relationship between attitudes and behaviours, as well as the nature of the literature that forms the basis of this study. First, since as psychologists say, attitudes are incipient actions, it is assumed that attitudes and behaviours are linked. By studying either one of attitudes or behaviours, we may enhance our understanding of the other. Second, much of the literature identified in this study concerning both the various types of interaction in the practice of distance education, and principles of good practice, is not empirical research. As this literature reflects the opinions and

perceptions of the authors, as well as reviews of previous literature, it is recognised that such

references have inherent limitations. However, for this study, it is assumed that interaction is

an important part of the learning process. In addition, it is assumed that principles of good

practice reflect ideals to which educators aspire.

CHAPTER II

LITERATURE REVIEW

This chapter reports on the literature and research associated with distance education faculty, the four types of interaction in distance education, as well as an overview of various sets of principles of practice and their applicability to this study. In addition, literature dealing with Athabasca University (AU), the context for this study, is also discussed.

Introduction

Distance educators devote considerable energy to researching and documenting their field. Some issues and topics have received more attention than others. In their guest editorial for the American Journal of Distance Education's (AJDE) special issue on distance education faculty nearly a decade ago, Purdy and Wright (1992) emphasised that within the umbrella of distance teaching, there are "very different experience(s)…[and] different perspectives" (p. 2). Their overview of the literature on distance education at that time revealed many articles about technologies and their application, and acceptance of various media by students. In assessing the range of topics addressed, Purdy and Wright state that "articles that deal with…implementation of specific forms of distance education teaching to targeted student groups abound" (p. 2). In that same issue of the AJDE, Dillon and Walsh (1992) conducted a review of distance education literature and found that "the dominant theme of distance education research has been the learner" (p. 5). These authors also cited Beaudoin's (1990) conclusion that faculty have been "largely neglected by the research" (Dillon & Walsh, 1992, p. 5).

After reviewing the distance education literature, Anderson (1997) states that most research deals with "single variables in isolation…[and is]…evaluative (i.e., related to individual programs)" (p. 3). Lockhart, Borland and Howard (2000) cite a review of the literature published in the 1990s in which "Merisotis and Phipps (1999) found that the majority of what has been written is opinion pieces and how-to articles that do not include original research with faculty…as subjects" (p. 3). It appears that there is a need to conduct research into distance education practice, based on data from practitioners in different programs who use various delivery methods.

Distance educators also devote considerable effort to attempting to define and conceptualize their field. Saba (2000), in a review of distance education research, observes, "a common theme in distance education research is the concept of interaction, which indicates its centrality in conceptualizing the process of teaching and learning" (p. 4). Moore (1989) suggested that "distance educators need to agree on the distinctions between three types of interaction…[since]…the greatest problems of communicating about concepts, and therefore, practice in distance education arise from our use of crude hypothetical constructs" (p. 1). Moore then goes on to describe three distinct types of interaction in distance education: learner-content, learner-instructor and learner-learner. Moore's model of interaction is frequently cited in the distance education literature. In fact, Moore's contribution is so fundamental that some authors state, much as Anderson (1997) has, that "distance education *is composed of* three types of interaction [italics added]" (p. 24) and that "each of these [types of interaction] represent methods by which distant learners receive instruction" (p. 25).

Though many distance educators use Moore's (1989) model of three types of interaction as a basis for discussing interaction in distance education, Hillman et al. (1994) believe that this model fails to consider a fourth "type of interaction that is unique to distance education" (p. 31). Hillman et al. (1994) further developed the construct of interaction in distance education and noted that "Moore's (1989) three types of interaction do not account for all of the interactions in today's educational environment. The addition of high-technology communications systems necessitates the conceptualization of an additional type of interaction: learner-interface interaction" (p. 39). These distinctions and labels of four types of interaction provide a clear framework for examining distance education practice.

The purpose of this study is to "move beyond the standard questions regarding student attrition and which technology works best" (Beaudoin, 1991, p. 5) and contribute to a better understanding of how distance educators provide for and facilitate various types of interaction. In order to achieve this purpose, the construct of interaction is used as a framework to gather information about and illustrate a particular cross-disciplinary case of practice in delivering education at a distance through various delivery methods. The case of practice under examination in this study is undergraduate education at Athabasca University, a dedicated distance university. The undergraduate faculty at AU develop and deliver education at a distance. The study has two broad objectives. The first objective is to determine practitioners' attitudes toward interaction as a component of distance education practice. The second objective is to determine how these attitudes and outlooks are demonstrated in practice.

Distance Education Faculty

Dillon and Walsh (1992) conducted a thorough review of the literature related to distance education faculty, in order to provide "insights into key issues concerning faculty participation in distance education" (p. 5). They reported that "many studies cite faculty resistance to instructional technology" (p. 5). Other studies regarding faculty in distance education focus on faculty resistance to adopting technological innovation, and the resistance of faculty teaching in conventional universities to embrace distance teaching. While interaction is central to education (Garrison & Shale, 1990) and a central theme in distance education (Saba, 2000), it must be mediated by some sort of communication device (Moore, 1989) or system. According to Saba (1988), the need for mediation is what makes distance education distinct from conventional education, and this may account for the abundant research and literature on communication and other technologies. However, as McNeil (1990), cited in Dillon and Walsh (1992) observed, "attitudinal issues – how people perceive and react to these technologies – are far more important now than structural and technical obstacles in influencing the use of technology in higher education" (p. 5).

Landstrom (1995) reported on faculty perceptions toward distance teaching and distance learners. Landstrom gathered information through telephone interviews with 20 distance instructors who were using various distance delivery methods and technologies to teach at a conventional university in Canada. In her review of the literature, Landstrom reports that issues for distance teachers include comparison of interaction between face-to-face and distance teaching, reports of distance teaching as less prestigious, and feeling that distance teachers receive fewer rewards. While she focused more broadly on faculty attitudes toward distance education rather than on interaction, her respondents found that contact with

students was the "major reward for teaching in-class…[and]…the lack of contact and the anonymity of distance students was the major drawback for distance courses" (Landstrom, 1995, p. 152). Despite posted telephone office hours, few faculty had phone calls from students. Half the respondents felt that initiating phone contact with students might be a good idea, in order to "encourage the students to call more often" (p. 153). However, others were unsure of the value of instructor calls. Some of the instructors felt it would be either too time-consuming, or that such calls would violate "the spirit of distance education [which] includes placing the onus on the students" (p. 153).

Landstrom (1995) also reported faculty's perceptions of distance students. It is relevant to this discussion of faculty attitudes toward interaction that a few of Landstrom's respondents reported surprise "that some students who never or rarely contacted them did so well in the course" (p. 154). One subject concluded that distance courses were more difficult for students to pass "because of fewer opportunities for feedback and reinforcement" (p. 154). Finally, in keeping with her finding that faculty perceived instructor-learner contact as the missing part of distance teaching, Landstrom's recommendations for further study include "analysis of the behaviour of instructors that encourages student contact" (p. 155).

Clark (1993) published the results of a national study in the United States of higher education faculty's attitudes toward distance education. His review of the literature on faculty attitudes indicates that the literature at that time included studies of faculty attitudes toward particular technologies as well as surveys of faculty; (a) in particular disciplines, (b) at land grant universities, (c) with different levels of experience in distance education, and (d) as part of project evaluation studies. Clark wanted to determine "how receptive…U.S. higher education faculty [are] to college-credit distance teaching" (p. 20). Clark (1993) reports that

"forty-four percent of respondents…mentioned concerns about the quality of interaction" and that "interaction concerns…were expressed by those who favored distance education as well as by those who did not" (p. 29).

Taylor (1991) studied attitudes of faculty at dual mode university in Australia in order to "measure and analyse university faculty attitudes towards teaching via the distance education mode and teaching on-campus using a conventional approach" (p. 7). He concluded that "personal job satisfaction for faculty appears to be dependent primarily on activities associated with the act of teaching, including the opportunity to work with motivated students and the quality of interaction with students" (p. 10).

One study of perceptions regarding interaction in distance education is that of Fulford and Zhang (1993). They studied how a group of learners in a course delivered by interactive television perceived learner-instructor and learner-learner interaction in distance education. They concluded that "the critical predictor of [learner] satisfaction was the perception of overall interaction…when learners perceive the level of interaction to be high, they will be more satisfied with instruction" (p. 8). However, there is scant discussion in the literature of the attitudes of faculty toward interaction in distance education, and apparently none involving faculty from a dedicated distance university. Further, there has been little attention to how faculty attitudes toward interaction might relate to faculty behaviour in supporting and facilitating different types of interaction in distance education.

<center>Interaction</center>

Wagner (1997) credits Moore's (1989) "schema in which he identifies three types of interactions" with providing distance educators a "sense of direction to the transactions that are typically involved in a distance learning endeavour" (p. 21). Wagner also concludes that

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Moore's schema "implies a purpose, intent and/or intended outcome of an interaction by virtue of indicating *who* or *what* is to be involved [italics in original]" (p. 21). The idea of looking at interaction in distance education as a purposeful activity (rather than simply a way to define what distance education looks like) is also apparent in Hillman et al. (1994). They describe learner-interface interaction as important "to ensure that the previously established forms of interaction [Moore's three types] are effective and that distance education is successful for the learner" (p. 39).

Recent literature includes discussion of interaction as: (a) an issue in the emergence of online and web-based learning (Berge, 1999; Hughes & Hewson, 1998); (b) a key part of any planning to establish and evaluate distance learning programs (Dasher-Alston & Patton, 1998); and (c) part of a framework of principles of good practice for virtual universities (Johnstone & Krauth, 1996). For a definition of interaction itself, Wagner (1997) provides some guidance, with her definition of interactions as "reciprocal events requiring two objects and two actions…[which] typically involve behaviors where individual and groups directly influence each other" (p. 20). For the key and foundational work on the types of interaction considered in this study, we turn to Moore (1989) and Hillman et al. (1994), which are summarised below. The descriptions of each type of interaction that follow here include a definition, a description of the purpose of the type of interaction and some examples, as well as discussion of the role of faculty in relation to each type of interaction in distance education.

Learner-Instructor Interaction

Learner-instructor interaction is defined as "interaction between the learner and the expert who prepared the subject material, or some other expert acting as instructor" (Moore,

1989, p. 2). According to Moore, learner-instructor interaction is "regarded as essential by many educators and as highly desirable by many learners" (p. 2). As well, Moore describes the purposes served by learner-instructor interaction, including; (a) motivating learners, (b) presenting information, (c) organising application of what is being learned, (d) evaluating learner progress, and (e) providing support to learners.

Learner-instructor interaction is especially important when learners must apply new knowledge. Moore (1989) notes that self-direction and motivation do not mean a learner knows a subject well enough to

> be sure they are (1) applying it correctly, (2) applying it as intensively or extensively as possible or desirable, or (3) aware of all the potential areas of application. It is for reality testing and feedback that interaction with an instructor is likely to be most valuable (p. 4).

In addition to the skills that may be acquired and the types of learning tasks facilitated through learner-instructor interaction, there are broader benefits reported in the literature. One benefit is increased student satisfaction. Fulford and Zhang (1993) report increased satisfaction when learners perceive higher levels of interaction, including learner-instructor interaction. Moore and Kearsley (1996) also allude to this benefit when they note that lack of sufficient feedback is "one of the most common sources of dissatisfaction and frustration for distance learners" (p. 119).

Moore states that the "frequency and intensity of the teacher's influence on learners when there is learner-teacher interaction is much greater than when there is only learner-content interaction" (p. 3). Learner-instructor interaction provides opportunities for clarification, elaboration, and explanation, whether the dialogue is: (a) text-based (e.g., a teacher's comments on a correspondence lesson); (b) oral (e.g., audiotape); (c) synchronous

(e.g., audioconference); (d) asynchronous (e.g., computer conference, e-mail) or in some other form.

The role of faculty in learner-instructor interaction varies, depending on whether the delivery method is synchronous or asynchronous. Choice of media (print, online text, audio, video, etc.) will also affect the specifics of a faculty member's role regarding learner-instructor interaction.

Learner-Content Interaction

Learner-content interaction is defined as "interaction between the learner and the content or subject of study" (Moore, 1989, p. 2). Moore describes learner-content interaction as "a defining characteristic of education" as it "results in changes in the learner's understanding…perspective, or the cognitive structures of the learner's mind" (p. 2). Holmberg's description of the process of "guided didactic conversation" (1986, p. 55) in which learners engage in internal dialogue about the concepts and information they encounter in text typifies this type of interaction. Moore (1989) traces the development of text-based learner-content interaction from the "oldest form of distance teaching that aimed to facilitate interaction with content…[that of] didactic text" (p. 2) to the nineteenth century when a print study guide would accompany a textbook and provide "explanation and…directions for its study" (p. 2). More recently, learners have been able to interact with content in the form of radio and television broadcasts, "electronic recordings on audiotape, videotape and computer software" (p. 2). When Moore published his editorial on three types of interaction for the American Journal of Distance Education in 1989 "interactive videodisc [was] the most advanced form of didactic interaction invented" (p. 2). Despite technological advances since

then, "effective learning environments" still include learner "interactions

[with]…instructional materials" (Ragan, 1999, p. 4).

Faculty's role in learner-content interaction generally comes during the instructional

development phase. While careful design of learning materials can ensure that learner-

content interaction accomplishes many of the same purposes that learner-instructor

interaction does (motivating and evaluating learners, etc.) the "lack of feedback from

individual learner to educator makes these teaching procedures highly generalized, not

individual" (Moore, 1989, p. 3).

Learner-Learner Interaction

Learner-learner interaction is defined 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" (Moore, 1989, p. 4). It is this type of interaction that Moore predicted would

be a "challenge to our thinking and practice in the 1990s" (p. 4). Educators and students are

usually familiar with grouping students in classes, and these may appear to be ideal for

learner-learner interaction. However, such groupings may be organised because they are the

"only organizational form known to most teachers" (Moore, p. 4). Increasingly, new

technologies offer the potential for distance educators to design increased learner-learner

interaction into their courses (Moore & Kearsley, 1996). This design may be within a formal

class or cohort structure, or more informally through study groups and online discussion with

participants located anywhere across the globe.

In some situations, learner-learner interaction is a useful, sometimes essential

resource. According to Moore (1989), learning specific skills (e.g., how to interact

effectively) may require learner-learner interaction. Otherwise, Moore believes that learner

characteristics such as "age, experience and level of autonomy" (p. 5) will determine the

need for and degree of learner-learner interaction required. While Berge (1999) reports that

"it is not clear from research or evaluation data that interaction improves the quality of

learning in most distance education programs" (p. 5) other studies identify "peer interaction

among students as a critical variable in learning and cognitive development at all levels"

(Harasim, 1990; cited in Graham & Scarborough, 1999). Graham and Scarborough describe

another benefit of learner-learner interaction by citing remarks by Cohen (1984) that

"research also shows peer interaction assists learners in understanding new concepts and

provides an opportunity to commit these concepts to memory" (Cohen, 1984; as cited by

Graham & Scarborough, 1999). In addition, learners in a mathematics course studied by

Foley and Schuck (1998) described group collaboration as the most satisfying aspect of the

course.

The role of faculty in learner-learner interaction can vary widely. In the design phase,

their role may be to ensure the provision of activities that provide opportunities for learner-

learner interaction. In delivery, faculty may facilitate or support learner-learner interaction

through various synchronous or asynchronous conferencing arrangements.

<u>Learner-Interface Interaction</u>

In proposing a fourth component of interaction (learner-interface interaction),

Hillman et al. (1994) note that "a facet of distance education that is increasingly overlooked

is the effect of high-technology devices on interaction" (p. 32). They define learner-interface

interaction as "the process of manipulating tools to accomplish a task" (p. 34). They state that

"successful learner-interface interaction requires…understanding not only the procedures of

working with the interface, but also the reasons why these procedures obtain results" (p. 34).

To support their assertion that learner-interface interaction is important, Hillman et al. cite

Garrison (1990), who states that "the effectiveness of the educational transaction is

dependent on the facilitation of communication" (p. 50). To clearly illustrate the importance

of learner-interface interaction, Hillman et al. point out that students studying a non-technical

subject (e.g., social sciences, history, etc.) in a distance class "are actually taking two

courses: one teaches the content and the other teaches the interface" (p. 35).

Issues related to learner-interface interaction continue to emerge. For example,

Gandolfo (1998) states that the "perception of the Internet as vital for all classes" does not

adequately address "the need to provide the conceptual tools allowing students to function in

our information-rich environment" (p. 27). As distance educators provide for and facilitate

use of these conceptual tools, they are providing for and facilitating learner-interface

interaction. In addition, some studies suggest that learner-interface interaction can have an

effect on both learning outcomes and learner satisfaction. Hillman et al. (1994) cite literature

that describes situations in which learners felt fearful or unable to participate in learning

activities requiring interaction with a technical interface. While the results in the course

studied by Foley and Schuck (1998) were generally positive, some students reported that

difficulties related to technical issues led to some decrease in their overall level of

satisfaction.

What is the role of faculty in providing for learner-interface interaction? Hillman et

al. (1994) suggest that when developing courses, educators can facilitate learner-interface

interaction by including "instructional activities that help the learner become comfortable

with the interface" (p. 36). These authors suggest other strategies including provision of

technical orientation sessions, providing or requiring a technology courses as a prerequisite,

or supplying tutorials to help learners master aspects of the interface. During the delivery phase of instruction, faculty may need to facilitate and provide for learner-interface interaction if it appears learners are having difficulties in the course.

These four types of interaction form a useful framework for examining distance education practice. However, if we were to simply inventory the practice of distance educators according to types of interaction, the result would be of little value beyond the boundaries of the system under examination. The information gathered from an examination of the "agents of interaction" (Wagner, 1997, p. 21) -- instructor, content, interface and learner -- "set the stage for a more meaningful discussion of the outcomes enabled by various types of interaction" (p. 21). For Wagner, these interaction outcomes are not minute behavioural objectives. Rather, they are "conceptual benchmarks" (p. 25), broad statements very much like the principles of good practice found in the literature.

<u>Principles of Practice</u>

Distance educators devote considerable energy to examining and describing their field. However, Beaudoin (1991) asserts that "our imagination in researching … distance education practice has not kept pace with our innovation in applying distance education principles" (p. 1). Beaudoin hopes the distance education field is "not too far away from agreeing upon and articulating acceptable principles of good practice in distance education that are derived from reliable research in the profession" (p. 5). Since Beaudoin challenged distance educators to develop and articulate principles of good practice in 1991, a number of studies have contributed to the discussion of principles[1] of distance education practice.

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[1] In this study, the term "principles" is used to describe the various guidelines, benchmarks, and standards of practice that educators have developed and published. Despite the different labels, these terms all refer to the comprehensive and fundamental beliefs or values which act as guidelines for action.

Among these are two studies that have analysed and synthesised groups of documents outlining principles of practice (Anderson, 1997; The Institute for Higher Education Policy, 2000). Anderson published a long list of effective practices for distance educators, as identified by administrators and coordinators. Anderson reviewed the literature concerned with guiding principles and factors for success in education, including Chickering and Gamson (1987, reprinted in 1991), the American Council on Education [ACE] (1996), Western Cooperative for Educational Telecommunications (1999) and Global Alliance for Transnational Education [GATE] (1996). Anderson then developed a "comprehensive categorization of distance education practice" (p. 23). This categorization work resulted in seven primary areas of distance education practice and structured Anderson's data collection from administrators and coordinators about the practices they felt were most effective. The Institute for Higher Education Policy (2000) reviewed a number of articles and other documents proposing principles of practice, including: (a) the work by ACE (1996) also cited in Anderson (1997); (b) Chickering & Ehrmann's (1996) application of the work of Chickering and Gamson (1991) considering technology as a lever for implementing the seven principles of good practice; and (c) documents based on and illustrating the work of the Western Cooperative for Educational Telecommunications (1999).

In addition to the documents already mentioned, another set of principles of practice for distance education has been produced by Pennsylvania State University (1998) in collaboration with Lincoln University and Cheyney University. Finally, the Quality Assurance Agency (QAA) for Higher Education (1999) in the UK has developed guidelines for distance learning.

What emerges from this review is a partial list of documents describing principles of practice for distance education. This list is partial, because sources continue to become available as new work is completed, previous work is developed, and existing work is adapted to new situations. Continued and growing interest in the field of quality assurance, along with developments in technology and telecommunications, means that the amount of information and discussion regarding principles of practice is increasing quickly. Regular Internet Boolean searches of the term "principles of practice AND distance education" result in an expanding file of references and documents. For the purposes of reviewing the literature on principles of distance education practice for this study, the list of documents reviewed for this study includes work by:

- Global Alliance for Transnational Education [GATE] (1996),

- American Council on Education [ACE] (1996),

- Pennsylvania State University (1998),

- Quality Assurance Agency for Higher Education (1999),

- Western Cooperative for Educational Telecommunications (1999),

- Chickering and Gamson (1991) primarily, accompanied by Chickering and Ehrmann (1996), and

- The Institute for Higher Education Policy (2000).

Despite being included in Anderson's (1997) review, the principles of practice for transnational education (GATE, 1996) are not applicable to this study of faculty attitudes toward and practice of facilitating interaction in distance education. However, these principles and the context in which they are set may be of interest to Athabasca University as international markets are explored. In two other studies listed above (ACE, 1996;

Pennsylvania State University, 1998) extensive consultation and synthesis produced sets of guiding principles for distance education practice. In the case of the ACE study, however, Anderson (1997) concluded that these "principles of practice are too general to guide the development of specific program practices" (p. 22). The principles proposed by Pennsylvania State University focus only on design and development of distance education, and as in the case of the ACE study, the principles developed by it are very general. Both studies have a broad focus on institutional or system-wide concerns. This makes them less applicable to this current study on faculty attitudes and actions. However, part of the work by Pennsylvania State University included a faculty initiative to "develop a deeper understanding of the issues and opportunities presented by distance education, create new teaching and learning approaches, and empower faculty to become leaders in the effective use of distance education" (p. 2). As such, it may be a possible model for those at Athabasca University interested in similar institutional and faculty development processes there.

The work of the QAA (1999) is part of an extensive project to develop a "comprehensive quality assurance process for higher education" (par. 6). The fact that these principles deal with distance education at a higher education level made them appealing initially. However, their broad focus on institutional and higher education system concerns and issues makes these principles difficult to apply and relate to this study of faculty attitudes and action regarding interaction.

The principles produced by the Western Cooperative for Educational Telecommunications (1999) were supported by the U.S. Department of Education, and have been discussed and applied broadly in the United States. A number of organisations have adopted these principles for use in planning and evaluation of distance education initiatives.

However, these principles focus on various forms of electronic delivery, and "technology" is a common theme throughout. While they may be of interest to Athabasca University as electronically offered degrees increase in number, they are less appropriate than other sets of principles for application to this study of faculty attitudes and action regarding interaction in distance education.

In order to broaden the scope of this study beyond the particular context of Athabasca University, two documents dealing with principles of practice have been chosen for comparison to the description of interaction in practice at Athabasca University. The first is the seven principles of good practice in undergraduate education (Chickering & Gamson, 1991) in tandem with the further development on the seven principles by Chickering and Ehrmann (1996). The second is the document prepared by The Institute for Higher Education Policy (2000). Both of these documents are described briefly here.

The Seven Principles

Chickering and Gamson's seven principles (1991), based on "findings from decades of research" (Lockhart, et al., 2000, p. 4), were originally developed in the field of higher education. Chickering and Gamson's seven principles state that good practice in undergraduate education:

1.   Encourages student-faculty contact

2.   Encourages cooperation among students

3.   Encourages active learning

4.   Gives prompt feedback

5.   Emphasizes time on task

6.   Communicates high expectations

7.   Respects diverse talents and ways of learning.

(Chickering & Gamson, 1991, p. 63)

Principle 1 clearly represents learner-instructor interaction, and principle 4 describes a function of learner-instructor interaction. Principle 2 represents learner-learner interaction. Study guides and student manuals for Athabasca University courses commonly include learning objectives, which serve to both guide and engage students in the learning process. Study guides and student manuals also include advice to students about the time they should expect to spend on various course-related activities. For this reason, Chickering and Gamson's principles 3 and 5 describe functions of learner-content interaction. Therefore, five of Chickering and Gamson's seven principles can be connected to or aligned with three of the four types of interaction considered in this study. While the statement that the seven principles "provide substantive research-based advice that can enrich our understanding and practice of teaching" (Sorcinelli, 1991, p. 22) does not come from the field of distance education, the seven principles have been applied extensively (Chickering & Ehrmann, 1996) and may be considered as validated by educators. The primary focus of the seven principles is on teaching and learning processes, rather than institutional systems. As such Chickering and Gamson's work is a good tool for reflecting on the picture of practice developed in this study.

Institute for Higher Education Policy

There are both advantages and disadvantages in choosing the Institute for Higher Education Policy's (2000) set of principles as a tool in this study and both are evident in its title "Quality on the Line: Benchmarks for Success in Internet-based Distance Education." The fact that this document addresses distance education makes it a good complement to the

seven principles that focus on higher education. That it is concerned with online learning may reduce its applicability to this study, which is concerned with attitudes among AU faculty who use either or both print-based and online delivery methods. This possible drawback is, however, balanced by other features. The work of The Institute for Higher Education Policy is current, and includes a review of various distance education literature. Most important is the fact that among The Institute for Higher Education Policy's benchmarks, there are items that align with all four types of interaction upon which this study is based (Appendix G). In addition, as in this study, The Institute for Higher Education Policy study looked at both attitudes ("how important is the benchmark to ensure quality?") and behaviour ("to what extent is the benchmark present in the program?") and their report includes descriptive statistical data on both these topics.

<div align="center">The Athabasca University Context</div>

Athabasca University is a good setting for researching issues of interaction in distance education practice. First and foremost, Athabasca University is a dedicated, distance delivery university. Second, a number of details from two of Athabasca University's recent institutional planning documents indicate that the environment is both receptive and conducive to research into distance education practice. Finally, Athabasca University is dealing with the same emerging trends in distance education that are having an impact on the rest of the field. The Athabasca University context, these emerging trends, and their impact on faculty, are outlined below.

Distance Education at AU

In a recent case study, Davis (2001) described the background, structure and processes of Athabasca University. Details relevant to this study are included here. In

1999/2000, AU "offered courses and programs to approximately 20,000 students across Canada" (Davis, p. 1). The number of course registrations is growing rapidly, with "23% growth in 1999/00 to a total of about 33,000 course registrations" (p. 1). As Canada's "only stand-alone distance education university" (p. 3), AU's mandate includes research into distance and open learning, as well as development and delivery of a wide range of courses and programs. Most Athabasca University students (80% of course registrations) study through individualized home study, with the remainder in "paced cohorts online…or on-site at AU learning centres or at partner institutions" (p. 2).

Davis (2001) states that "academic staff…to a large extent…drive this organisation [a situation] which is intended to allow a good deal of innovation and freedom" (p. 3). The important role of academic discussion in decision-making is balanced by "the Student Services group [that] has an important and parallel role in decision making, and provides…focus on the administrative needs and experiences of students" (p. 4). Even so, faculty, through their Academic Centres "are free to adapt their processes to meet curriculum and teaching needs, and have a fair amount of discretion in using savings in their delivery budgets" (p. 5). Faculty, with support from educational media staff (editors, designers, etc.) are responsible for developing courses. Faculty also deliver courses, with assistance from part-time tutors and instructors.

Research and Strategic Direction

It is apparent from two of Athabasca University's recent institutional planning documents that the AU environment is both receptive and conducive to research into distance education practice. The first of these documents is Athabasca University's Strategic University Plan (SUP) (Athabasca University, 1996), with its reference to a number of

strategies seen as fundamental to Athabasca University's organizational development. Two strategies especially relevant to this study are "support for linking pedagogy and research" and "support for a democratic learning organization" (Athabasca University).

The Strategic University Plan (SUP) mentions a number of specific activities as contributing to the first strategy, that of linking of pedagogy and research. Most relevant to this study is the statement that "Athabasca University will undertake regular examinations and evaluations of the effectiveness of its teaching activities (and) undertake periodic, critical analyses of distance education trends and pedagogies, and disseminate the findings internally and externally" (Athabasca University, 1996). The Strategic University Plan also includes a number of activities designed to contribute to the second strategy of ensuring that Athabasca University functions as a democratic learning organisation. Three items of particular relevance to this study are found in the statement that "Athabasca University is one whose culture encourages:

- continuous reflection about the nature of its business

- continuous questioning about how it performs its business (and)

- continuous and strategic institutional data gathering to monitor trends and performance" (Athabasca University, 1996, sec. 4 ii, par. 13).

A second major planning document, the Strategic University Plan Update 1999-2003 (Athabasca University, 1999), indicates that one of the two elements of Athabasca University's research profile is "mission-critical research…[consisting of]… research into technology and pedagogy in distance education, research into distance and open learning methods, and comparative studies" (Athabasca University). Such research is considered by

Athabasca University to be "critical to the quality of a student's educational experience at AU" (Athabasca University, 1999, sec. 5, par. 3).

<u>Emerging Trends</u>

Effects of the "extraordinary growth of technology-mediated distance learning in higher education" (The Institute for Higher Education Policy, 2000, p. 1) are being felt at Athabasca University. In the period since the mid-1990s there has been "extraordinary growth and change" (Davis, 2001, p. 13) at Athabasca University, and "with a few exceptions, each academic is working on some aspect of online conversion or course and program enhancement" (p. 14). Though "there is a spectrum of online enhancements at AU" (p. 2) AU maintains, at the undergraduate level, "options for students who are not able to access online technologies, while exploring and anticipating ways that new technologies can enhance learning" (p. 3). The "growth of interest in and use of distributed learning" (p. 4) puts pressure on faculty, staff, and institutional planning and development processes. Rapid growth and change mean Athabasca University must deal with a number of tensions. Of particular relevance to this study is the tension between "the drive for more use of technology and the possible consequent exclusion of those learners AU is mandated to serve" (Davis, p. 5). The addition of new technologies may serve to both enhance interaction and provide new opportunities for various types of interaction. It may also mean changes in faculty attitudes toward and actions in regards to various types of interaction.

This brief overview of Athabasca University's structure, activities, research concerns, and place in the changing field of distance education, taken from a recent case study and strategic institutional documents, is intended to convey a sense of strategic direction and organisational culture at Athabasca University. These factors clearly make Athabasca

University an appropriate setting for gathering information about faculty attitudes and behaviour toward interaction in delivery of undergraduate education at a distance.

Summary

The focus of this chapter has been a review of the literature regarding distance education faculty, interaction in distance education, principles of good practice and Athabasca University, the context for this study. In education, including distance education, interaction is often identified as important to the learning experience. There is considerable literature dealing with the types and benefits of interaction. In distance education literature in general, and in the literature dealing with attitudes toward interaction in particular, there is greater focus on learners than on faculty.

Principles of good practice serve as guidelines for developing and assessing effective practice. There are a number of sets of principles of good practice in the literature. Chickering and Gamson (1991) and The Institute for Higher Education Policy (2000) were found to be most relevant to this study. The four types of interaction studied here are represented in both sets of principles of good practice.

Athabasca University is a dedicated distance university. While print-based individualized study is most common in undergraduate education at AU, online enhancements to programs as well as online delivery methods are becoming more common.

CHAPTER III

METHODOLOGY

Introduction

The design of this study was intended to produce examples and some emerging consensus from one especially chosen group of practitioners. These practitioners are not representative so much as illustrative, in that they work in a single mode distance environment; there are relatively few dedicated distance universities. This chapter provides a synopsis of and background to the study, as well as a description of the research design, participants, instruments, as well as data collection, processing and analysis.

Background to Study

While working in an organizational planning and development unit at a vocational college, the researcher became interested in the concept of organizational alignment (Tosti & Jackson, 1994). The researcher, as part of an institutional project team developing technology integration plans, applied Tosti and Jackson's organizational alignment model to describe organizational features of the vocational college. One outcome was an increased understanding of the usefulness of examining an organization's cultural "path" (values, principles and behaviour) in tandem with its strategic "path" (goals, strategies and tactics). Tosti and Jackson state that alignment within each of the cultural and strategic paths are as important as alignment between the two paths. The researcher has maintained an interest in examining what Tosti and Jackson would call cultural aspects of an organization (e.g., attitudes and actions) ever since.

While engaged in graduate level study at a distance, the researcher began to learn about the concept of interaction in distance education. In the course of interacting with faculty through study guides, assignments and computer conferences, it became clear to the researcher that views, values and behaviours regarding interaction vary among individual faculty. Thus did the idea of studying faculty attitudes and actions regarding interaction, as well as how a description of Athabasca University faculty's attitudes regarding interaction might be seen to align with principles of good practice, develop into a research interest.

Synopsis of Study

The purpose of this study was to contribute to a better understanding of how distance educators provide for and facilitate various types of interaction. This study had two broad objectives. The first objective was to determine practitioners' attitudes toward interaction in undergraduate education at a distance. The second objective was to determine how these attitudes and outlooks are demonstrated in practice. This study used the construct of four types of interaction in distance education as a framework to gather information about and illustrate a particular cross-disciplinary case of practice in delivering education at a distance through various delivery methods. The case of practice examined in this study is undergraduate education at Athabasca University (AU), a dedicated distance education university. This study used the survey method, and the survey was conducted through the mail.

In order to achieve its stated purpose, this study examined the following three general research questions:

1.   What are the attitudes of Athabasca University faculty toward interaction as a component of distance education practice?

2.   Do Athabasca University faculty provide for interaction in their practice, and if so,

        what tools, processes and activities (approaches) do they employ in order to provide

        for and facilitate different types of interaction as they deliver undergraduate education

        at a distance?

3.   Are there associations between how frequently approaches are used, how satisfied

        faculty are with their use of these approaches and how important faculty believe the

        approaches are to student learning?

These main research questions were designed to achieve the purpose of describing a

particular case of distance education practice in terms of faculty attitudes and action

regarding interaction. Though the results of this study may not be generalizable beyond the

case examined, in order to broaden the scope beyond the particular context of Athabasca

University, this study compared the description of interaction in practice at Athabasca

University to principles of good practice from the literature.

<u>Design</u>

        In order to answer these three main research questions, a number of strategies were

undertaken. Preliminary data collection (to address questions 1 and 2 above) was conducted

through a survey of Athabasca University faculty who teach undergraduate courses. This data

was analysed (in order to provide descriptive statistics from the data collected as well as

explore possible associations/correlations in order to answer question 3 above) through use of

the SPSS software. Principles of good practice that were used as comparisons to the

Athabasca University description of faculty practice included Chickering and Gamson's

(1991) seven principles of good practice in undergraduate education, and results from a

survey of six institutions regarding the presence and importance of a number of benchmarks

for success in Internet-based distance education (The Institute for Higher Education Policy, 2000).

Participants

The subjects for this study included all faculty at Athabasca University who deliver undergraduate education at a distance. Undergraduate faculty includes those individuals with the job classification of professor, associate professor or assistant professor. The list of subjects for this study was drawn from the July 2000 Athabasca University staff contact list. There were 62 individuals within the group of potential subjects, representing a broad range of academic disciplines including Accounting, Anthropology, Commerce, Computer Science, Economics, English, French, History, Mathematics, Nursing, Philosophy, Political Science, Psychology, Science, Sociology, and Women's Studies. E-mail addresses for the potential subjects were found in the July 2000 Athabasca University staff contact list. As a result of sending an initial e-mail message (Appendix B), describing the purpose and procedures of the study to all 62 faculty members, it was determined that 4 of the 62 subjects were on leave. These 4 faculty were removed from the list of possible subjects, and the number of potential subjects was reduced from 62 to 58 subjects.

Of this list of 58 possible subjects, 7 subjects were removed for the following reasons:

- One person asked, via e-mail, to be removed from the study. This individual had worked at AU for less than 6 months and didn't feel this was sufficient experience for inclusion in the study.

- A second person asked, via e-mail, to be removed from the study. This individual no longer teaches undergraduate courses. A third person returned the survey without

completing it. This individual, while classified as a professor in the AU staff contact list, is doing strictly administrative work and is no longer teaching.

■   Support staff for two faculty returned uncompleted surveys, noting that the professors were on extended leave.

■   Two individuals, when reminded to return their surveys, reported that: (a) the survey had already been mailed, and (b) the completed survey, sealed in the stamped envelope, had been given to another person to mail. Neither of these surveys was ever received.

As a result of these factors, the potential number of subjects was reduced from 58 to 51 subjects. Completed surveys were received from 41 subjects, resulting in a response rate of 80%.

Instrument

The tool for gathering data for this study consisted of a mailed survey (Appendix D). The survey form was designed to gather data in response to two research questions. First, what are AU faculty's attitudes toward the four types of interaction? Second, do AU faculty provide for the four types of interaction at the undergraduate level at Athabasca University, and if so, how?

Draft Instrument

A draft survey form was prepared, in which each of four types of interaction (learner-instructor, learner-content, learner-interface, and learner-learner) was accompanied by a set of suggested approaches for respondents to choose from. In the initial draft form, these suggested approaches were drawn from the research results, and planning and assessment instrument, published by Lockhart et al. (2000), as well as from Hillman et al. (1994).

Lockhart et al. (2000) used Chickering and Gamson's (1991) seven principles of good practice in undergraduate education as a framework to survey faculty involved in undergraduate education at a distance, in order to gather and organise information about distance education practice, and so identify specific practices. The purpose of their study was to develop a planning and assessment instrument for faculty delivering undergraduate education at a distance. In this study, Lockhart et al. gathered data about the approaches used by undergraduate faculty teaching courses at a distance at Montana State University (MSU). The MSU context (faculty teaching some distance courses in a conventional university) differs from that of Athabasca University (faculty teaching primarily at a distance in a dedicated distance university). However, one outcome of the work of Lockhart et al., useful for this study, was an inventory of approaches used by faculty to deliver undergraduate education in a number of disciplines, at a distance. As this list includes approaches for three of the types of interaction in this study (learner-instructor, learner-learner and learner-content interactions) it was a useful starting point for developing a data collection instrument for this study.

For learner-interface interaction, the starting point was a list of approaches recommended by Hillman et al. (1994), as strategies for facilitating learner-interface interaction. The approaches provided in Hillman et al. and Lockhart et al (2000) provided a preliminary list of approaches for the draft form of the survey instrument.

Validation of Instrument

The draft survey form was piloted for both content and face validity. Determination of face validity was provided by two individuals with experience (as students, educators and

research consultants) in responding to surveys, as well as experience developing and administering surveys.

In order to ensure that the initial list of approaches provided for each type of interaction in the survey was adequate, Athabasca University course coordinators were polled in a process of content validation. All Athabasca University course coordinators with an e-mail address in the staff directory (n = 22) were invited by e-mail (Appendix A) to describe the approaches used by faculty in their academic centre for each of the four types of interaction. Course coordinators were chosen as a source of information for content validation of the survey form because of their knowledge of undergraduate education at a distance in their academic centre. Some aspects of the course coordinators' work differs from faculty, as they do not carry out research, and they are responsible for administrative tasks, as well as coordinating courses delivered by a number of staff in their centre. However, course coordinators do have credentials similar to those of faculty, and they also provide some instruction to students. Because course coordinators are knowledgeable about the work of faculty in their academic centre, they were a good source of information about approaches used by faculty. However, because their duties differ somewhat from those of professors, and because there is some discussion in the institution as to the precise parameters of a course coordinator's job description, they were not grouped with faculty for inclusion in the data collection process and were not included as potential subjects for this study.

Information about approaches used for each of the four types of interaction was gathered from four course coordinators through their e-mail replies and/or telephone interviews. During the telephone interviews, the researcher used approaches from the draft form of the survey as examples to clarify the various types of interaction by illustrating and

helping to draw distinctions between the various types of interaction. The academic centres represented by the course coordinators who provided content validation included Commerce and Administration, Psychology, State and Legal Studies, and Work and Community Studies. These four centres represent nearly one half (n = 29) of the faculty in the initial list of potential subjects (n = 62), and exactly 50% of the revised sample (n = 58; see Response Rate).

The researcher considered content validation input from four course coordinators to be adequate for three reasons. First, the number of faculty in the four academic centres represented 50% of the list of potential subjects. Second, the academic centres represented by the four course coordinators are responsible for courses from three of the four broad areas of undergraduate study at Athabasca University, including Applied Studies, Humanities and Social Science, but not including Science. Third, the list of possible approaches for each type of interaction in the final survey form included "other" as a choice, thus enabling respondents to add approaches that might be missing.

As a result of studying the feedback from the course coordinators, the draft form of the survey was revised in two ways. First, the definitions of each of the four types of interaction (phrased as operational definitions with citations from the literature in the draft survey) were clarified and simplified. Second, the approaches suggested as responses for each of the four types of interaction were modified to reflect the approaches listed by the course coordinators.

The wording and choices of the final survey form (Appendix D) were the result of incorporating feedback from both the face and content validation. For learner-instructor interaction, the five approaches faculty could choose from included; (a) e-mail, (b) telephone,

(c) postal mail, (d) printed study guides, [2] and (e) face-to-face meetings. The five approaches

provided for learner-content interaction included; (a) printed study guide, (b) printed student

manual,[3] (c) video recordings, (d) multimedia on CD-ROM, and (e) multimedia on the

Internet (WWW). For learner-interface interaction, faculty could choose from; (a) face-to-

face orientation sessions, (b) print instructions or tutorials, (c) referral to the AU helpdesk,

(d) multimedia resources on the WWW, and (e) requiring a technology course as a

prerequisite. The five possible approaches faculty could choose for learner-learner interaction

included: (a) e-mail; (b) online bulletin boards; (c) telephone; (d) group projects (e.g., case

studies, group assignments, etc.); and (e) asynchronous computer conference.

In addition to these initial suggestions of approaches, the survey form provided

respondents the choice of "other" so they could supply information about any additional

approaches they use.

Final Version of Instrument

The design of the survey instrument for this study was based on the belief that not all

four types of interaction may be commonly understood and/or applied by all faculty. For

example, the concept of learner-interface interaction is a more recent addition to the distance

education literature than Moore's (1989) three types of interaction -- learner-instructor,

learner-content, and learner-learner. The concept of learner-interface interaction (Hillman, et

al., 1994) also builds on and responds to Moore's (1989) work on the other three types of

interaction, so it is possible that learner-interface interaction might be less well integrated

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[2] An AU course study guide provides specific information about particular course components (e.g., schedules, commentary on readings, exam study questions, advice for selecting essay topics, etc.).

[3] An AU course student manual provides general information about the course, course contracts and evaluation, as well as advice and contact information regarding resources such as tutors, library services, and so forth.

into subjects' understanding of interaction in distance education. This consideration of the differences and possible various understandings of these four types of interaction guided decisions about ordering of questions in the survey form for this study.

Learner-instructor interaction was the first type of interaction faculty were questioned on. This type of interaction was placed first according to Dillman's (1978) advice on criteria for selecting the topic of the first question in a survey. The researcher believed that learner-instructor interaction would "be clearly applicable to everyone" and sufficiently "easy, so that virtually all respondents [would] need only a few seconds to comprehend it" (Dillman, 1978, p. 128). On the other hand, for the reasons described in the previous paragraph, the researcher believed that, of the four types of interaction studied, learner-interface interaction would likely be the *least* easy for subjects to respond to. In fact, when piloting for content validity with Athabasca University course coordinators, learner-interface interaction required the greatest amount of definition and explanation on the part of the researcher. The researcher deliberately avoided placing learner-interface interaction as either the first or last question. Learner-interface interaction did not fit the criteria for the first question, as this position is recommended for easy, widely applicable questions. The researcher also believed that it should not be placed last, where fatigue with the survey might encourage subjects to skip the question rather than invest energy in understanding a newer concept/type of interaction as well as describe the approaches that make up their practice. Alreck and Settle (1995) advise that "when several similar items appear in sequence, the routine nature of responding may lead to a response strategy or policy" (p. 103). In order to reduce possible bias from routine response, learner-interface interaction was placed third between the more familiar learner-content and learner-learner interactions. Learner-learner interaction was

placed fourth because the researcher believed it to be an easy concept to understand, but perhaps less broadly applicable than either learner-instructor or learner-content interaction. With a larger group of subjects, it may have been useful to prepare different forms of the survey instrument, with different ordering of interaction types. This strategy might serve to reduce the likelihood of order bias, but with a list of only 58 potential subjects, the small possible benefit of such a strategy did not justify the cost of implementing it.

Within each of the four types of interaction, and for each approach a subject indicated they used, three questions were asked. The first question asked respondents to indicate how frequently they use each approach. There were four possible answers, on a four-point Likert scale with choices ranging from "very frequently" through to "seldom" (for all questions, "na" was available as a choice for subjects who felt neutral or unsure). The second question asked subjects to indicate their level of satisfaction with their use of the particular approach. There were four possible responses, on a four-point Likert scale with choices ranging from "very satisfied" through to "very dissatisfied". Finally, for each approach a subject indicated they used, they were asked to rate the importance of the particular approach to helping learning happen. There were four possible responses, on a four-point Likert scale with choices ranging from "very important" through to "not important".

Figure 1 depicts a sample page from the survey instrument. It illustrates the basic format of the survey questions for each of the four types of interaction. While it has been modified from the actual survey form, with some choices removed in order to conserve space, it does demonstrate how the questions of frequency, satisfaction and perceived importance were presented, for each of a number of approaches, within each of the four types of interaction.

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For each of these approaches you use for learner-instructor interaction…	Place √ here ↓	How frequently do you use this approach? (1: very frequently to 4: seldom)					How satisfied are you with this approach? (1: very satisfied to 4: very dissatisfied)					How important is this approach to helping students learn? (1: very important to 4: not important)				
e-mail	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
telephone	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
printed study guide	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
face-to-face meetings	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
other (please specify) _____	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na

Figure 1. Sample Survey Page Illustrating Likert Scale and Questions for Different Variables and Approaches, Within One Type of Interaction

Basic information about a subject's main delivery mode (print-based home study, online delivery, other) and years of experience at Athabasca University was also gathered. The variables of frequency, satisfaction and perceived importance to helping learning happen were chosen to produce a range of detailed information about faculty's use of particular approaches. Satisfaction with, and perceived importance of each approach to helping learning happen were both selected in order to reveal faculty attitudes toward each approach and each type of interaction. Faculty's satisfaction with, as well as the perceived importance of a type of interaction indicates whether a type of interaction is highly or moderately valued, or valued very little. Frequency of use was included in order to indicate whether faculty

provided for the particular type of interaction and if so, whether this behaviour was a major

or minor part of their behaviour and practice.

Each survey form was assigned an individual survey code; the survey code for each

subject was noted for the duration of the data collection phase only. There were two purposes

for this code. The first purpose was to track the return of surveys, in order that those subjects

who completed and returned their surveys were not bothered with reminder notices. The use

of a code also enabled the researcher to identify which academic centre a survey response

came from. Once data was received, the individual survey codes connected specific survey

data with the name of the academic centre only, not individual subjects. This ensured that

survey responses could not be connected to individual faculty members.

<div align="center">Data Collection</div>

An initial e-mail message (Appendix B) was sent to all undergraduate faculty (62

potential subjects). This e-mail described the purpose of the study, indicated that a survey

package was being mailed soon, and invited faculty to complete the survey. Four of these e-

mails were returned automatically by the e-mail system with messages indicating that the

four faculty were on leave until a future date (well into 2001). These 4 faculty members were

removed from the list of possible respondents, and the group of potential subjects was

reduced from 62 to 58 individuals.

A package containing a cover letter (Appendix C), survey form (Appendix D),

stamped return envelope and small token as an inducement were mailed through Athabasca

University's interoffice mail system to each of the 58 subjects. The timing of this mailing

was designed to have the packages arrive in faculty offices on a Wednesday, typically the

day faculty travel to AU Central, where the survey packages were mailed. This timing

strategy was intended to increase the chances of faculty finding their survey package near the top of their incoming mail. Most completed surveys were returned by mail, and nearly half were returned within 1 week of distribution. Using the individual participant codes, a checklist of which faculty returned completed surveys ensured that reminders were not sent to those who had already submitted completed surveys. An e-mailed reminder (Appendix E) was sent to non-respondents 1 week after the survey package was mailed.

<center>Data Analysis</center>

Data from the survey forms was entered into an electronic spreadsheet with one worksheet for each major section of the survey form, including: (a) basic information (individual survey codes, academic centre, years of experience, main mode of delivery); (b) the four types of interaction (learner-instructor, learner-content, learner-interface, learner-learner); and (c) comments.

This study produced two groups of data. The first was basic information about the faculty in the study, including their academic centre (general area/subject of instruction), number of years as a member of Athabasca University's undergraduate faculty, and main mode of delivery (print, online, or other). This data was analysed to produce frequency distribution and descriptive statistics regarding the range and types of experience among the subjects.

The second type of data consisted of information about the approaches faculty used to facilitate and provide opportunities for the four types of interaction, how frequently they used each approach, their level of satisfaction and how important they felt each approach was to helping learning happen. This second set of data was analysed in order to produce descriptive statistics regarding faculty attitudes toward the four types of interaction (their satisfaction and

perceived importance) as well faculty behaviour regarding the four types of interaction (approaches used and how frequently). Originally, the researcher intended to use chi-square analysis to look for possible associations between the variables of satisfaction, perceived importance and frequency of use. However, the number of cases per cell was too small to run chi-square analysis. Pearson's correlation (with level of significance of .05) was chosen to determine possible correlations between frequency of use, satisfaction and/or importance. Analysis of the second type of data is detailed below.

In order to determine and describe faculty attitudes toward the four types of interaction, the data from this study was analysed in order to answer the following questions:

- What levels of satisfaction and importance do faculty assign to the various types of interaction?

- Are any of the four types of interaction assigned higher levels of satisfaction and/or importance by faculty?

In order to determine and describe faculty behaviour regarding the four types of interaction, the data from the study was analysed in order to answer the question:

- Do faculty provide for interaction, and if so, what approaches do they use and how frequently?

To prepare descriptive statistics regarding satisfaction, perceived importance and frequency of use, the items on each of the four-point Likert scales were assigned values. All responses of very frequent, very satisfied and very important were assigned a value of 4. The responses frequent, somewhat satisfied and somewhat important were assigned a value of 3, with occasionally, somewhat dissatisfied and of little importance valued as 2. Survey responses of seldom, very dissatisfied and not important were assigned a value of 1. These

values were assigned in order to facilitate rank ordering of approaches. Rank ordering of approaches within and across the four types of interaction enabled the researcher to compare means, and to answer the questions:

- Are the approaches used most frequently also perceived as important?

- Do the approaches used most frequently also rank highest in terms of faculty satisfaction?

- Are faculty satisfied with the approaches they see as important?

Means for satisfaction, perceived importance and frequency of use were also compared according to subjects' level of experience at Athabasca University, and main delivery mode.

Finally, in order to measure possible correlations between the variables of frequency of use, satisfaction and/or importance, SPSS software was used to conduct a goodness of fit test to determine normality of distribution. Once a normal distribution was confirmed, Pearson's test of correlation was applied in order to determine the presence of any statistically significant correlations among the variables of frequency of use, satisfaction and/or importance.

Summary

This study used a mail survey to gather information about faculty attitudes toward four types of interaction, as well as determine how these attitudes are demonstrated in practice. Subjects were faculty at Athabasca University who deliver undergraduate education at a distance. Of a potential group of 62 subjects, responses were actually available from 51 subjects. Completed surveys were received from 41 of these potential subjects, resulting in a response rate of 80%.

The survey instrument was subjected to both face and content validation. Data was collected on each subjects' teaching experience at Athabasca University, as well as their attitudes toward, and behaviour regarding four types of interaction in distance education. Data analysis included preparation of descriptive statistics as well as a test of correlation.

CHAPTER IV

RESULTS

Purpose of the Study

The purpose of this study is to contribute to a better understanding of how distance educators provide for and facilitate various types of interactions. In order to achieve this purpose, this study has two broad objectives. The first objective is to determine practitioners' attitudes toward interaction in undergraduate education at a distance. The second objective is to determine how these attitudes and outlooks are demonstrated in practice.

Subjects

All subjects in this study are members of Athabasca University's (AU) faculty (professor, associate professor and assistant professor), who teach undergraduate courses. As of the July 2000 AU staff contact list, there were 62 potential subjects in this group. Four of these individuals were on extended leave, so these subjects were removed from the group. After the surveys were mailed, seven more subjects were removed. Five of these were because surveys were returned from faculty who; (a) withdrew voluntarily due to lack of experience teaching at AU, (b) were no longer teaching, (c) were no longer teaching undergraduates, or (d) were reported by their office support staff as being on extended leave. Surveys from the remaining two subjects were reported as mailed back, but never arrived. These were classified as lost. Of the remaining 51 possible subjects, completed surveys were received from 41, for an overall response rate of 80%. It is important to note, however, that the academic centres at Athabasca University do not have equal numbers of faculty.

Therefore, it is also useful to examine the response rate to the survey for this study by individual academic centre, as illustrated in Table 1.

Table 1.

Survey Response Rate by Academic Centre

Academic Centre	Potential subjects	# of responses	Response Rate
Commerce & Administrative Studies	9	6	67%
Computing & Information Systems	7	5	71%
Global & Social Analysis	5	4	80%
Language & Literature	4	4	100%
Nursing & Health Studies	1	1	100%
Psychology	5	5	100%
Science	8	6	75%
State & Legal Studies	5	3	60%
Work & Community Studies	7	7	100%
Total	51	41	80%

As Table 1 illustrates, subjects in this study come from all the academic centres delivering undergraduate education at Athabasca University. While examining the results in the pages ahead, it is also important to note the frequency distribution of subjects from each academic centre. It appears that the group of faculty for this study represents a reasonably even distribution between academic centres at Athabasca University. Table 2 illustrates the frequency distribution of responses in terms of the academic centres at Athabasca University.

Table 2.

Frequency Distribution of Survey Responses from Academic Centres

Academic Centre	# of responses	Percent	Cumulative percent
Commerce & Administrative Studies	6	15	15
Computing & Information Systems	5	12	27
Global & Social Analysis	4	10	37
Language & Literature	4	10	47
Nursing & Health Studies	1	2	49
Psychology	5	12	61
Science	6	15	76
State & Legal Studies	3	7	83
Work & Community Studies	7	17	100
Total	41	100	100

The faculty in this study report a wide range of years of experience as part of Athabasca University's faculty (M 9.31, SD 7.83, Mdn 7.0). Another way of describing the range of experience in this sample is to cluster into three groups, classified as new faculty (less than 5 years experience), experienced (5 to 10 years) and very experienced (10 or more years). Table 3 presents information regarding the range of subjects' experience as AU faculty.

Most faculty in this study (71%; n = 26), report print-based home study as the delivery mode they use for teaching. The remainder report using either online delivery (15%; n = 6) or a mixed mode combination of print and online (15%; n = 6). This mixed mode

Table 3.

Subjects' Experience as AU Undergraduate Faculty

Level of Experience	# of subjects	Percent	Cumulative percent
New (less than 5 years)	19	46	46
Experienced (5 to 10 years)	7	17	63
Very experienced (over 10 years)	15	37	100
Total	41	100	100

combination of print and online delivery is most often a 50/50 split (n = 5), with one report of a 60/40 split, print to online. This frequency is quite close to the description provided by Davis (2001) that most Athabasca University students (80% of course registrations) study through individualized home study (print-based), with the remaining course registrations delivered via other methods, including online.

The 29 subjects in this study who teach solely with print are, in the main, very experienced faculty with a mean of 10.40 years (*SD* 7.96 and *Mdn* 9.30) experience teaching at Athabasca University. However, the amount of variance is considerable, in fact 12 of the 29 subjects who teach via print are classified as new faculty (less than 5 years experience). The six faculty who teach via mixed print and online mode are experienced (*M* 9.70, *SD* 8.48, *Mdn* 5.60) though there is considerable variance in this mean as well. Three of the six faculty who teach via mixed mode are "new" faculty; one is "experienced" (5 to 10 years experience) and two "very experienced" (more than 10 years experience). Finally, the group of six subjects who teach solely online are relatively new Athabasca University faculty (*M* 3.50, *SD* 4.03, *Mdn* 2.25). Four of these subjects are classified as "new" faculty (less than 5

years experience), with three of these four reporting a half-year or less experience at Athabasca University.

<div align="center">Learner-Instructor Interaction</div>

For this study, learner-instructor interaction is defined as "interaction between the learner and the expert who prepared the subject material or some other expert acting as instructor" (Moore, 1989, p. 3), for purposes of motivating learners, presenting information, organising application of what is being learned and evaluation to determine if learners are making progress. In the survey form, a paraphrased version of this operational definition was provided.

Approaches to Learner-Instructor Interaction

Faculty participating in this study were provided five possible approaches to choose from for learner-instructor interaction (e-mail, face-to-face meetings, postal mail, printed study guide, and telephone). Faculty also suggested four other approaches for learner-instructor interaction in addition to these five, including: (a) conferencing (n = 3); (b) direct students to other resources such as university museums, collections, and displays (n = 1); (c) home labs (n = 1); and (d) online study guides (n = 1).

The frequency distribution of the approaches for learner-instructor interaction is depicted in Table 4. All faculty in this study use both e-mail and the telephone as approaches to learner-instructor interaction. In addition, the total of 170 responses for learner-instructor interaction (for all approaches, by all subjects) indicates a higher level of activity by these faculty for learner-instructor interaction than for any other of the four types of interaction studied.

Table 4.

Frequency Distribution of Approaches to Learner-Instructor Interaction

Approach	# of responses	Percent	Cumulative percent
E-mail	41	24	24
Face-to-face meetings	11	7	31
Postal mail	36	21	52
Print study guide	35	21	73
Telephone	41	24	97
Other	6	3	100
Total	170	100	100

Attitudes Toward Learner-Instructor Interaction

In addition to determining which approaches faculty use, this study also considered subjects' attitudes (reported levels of satisfaction and perceived importance) toward learner-instructor interaction. To determine these attitudes, faculty were asked to rate how satisfied they were with their use of each approach, as well as how important they felt each approach was to helping learning happen.

Satisfaction. Generally, faculty are very or somewhat satisfied with their use of all approaches except postal mail. Less than 12% of faculty reported any level of dissatisfaction with e-mail, face-to-face meetings, print study guides or telephone, compared with 33% who were somewhat or very dissatisfied with postal mail. Table 5 illustrates the frequency distribution and descriptive statistics regarding subjects' satisfaction with approaches to learner-instructor interaction.

Table 5.

Satisfaction with Learner-Instructor Interaction: Percent and Descriptive Statistics

Approach	Responses (N)	Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	M (SD)
E-mail	41	32%	56%	10%	2%	3.17 (.70)
Face-to-face	10	60%	30%	10%	0%	3.50 (.71)
Postal mail	36	44%	22%	17%	17%	2.69 (.98)
Print study guide	35	49%	45%	3%	3%	3.40 (.70)
Telephone	41	39%	49%	10%	2%	3.24 (.73)

Comparing means, it appears that faculty are most satisfied with their use of face-to-face meetings as an approach to learner-instructor interaction. However, readers should be cautioned that this result is based on a small number of reports (n = 10) relative to the other approaches. Among the more commonly reported approaches, print study guides received the highest satisfaction rating. Postal mail is reported as the least satisfying approach to learner-instructor interaction.

Importance. Of the approaches used by most faculty (e-mail, postal mail, print study guide and telephone), telephone and print study guides are rated most often as very or somewhat important. Postal mail is rated as being of little or no importance by 33% of faculty. E-mail received similar ratings of unimportance by 22% of faculty. Table 6 illustrates subjects' reports of how important they believe various approaches to learner-instructor interaction are to helping learning happen.

Table 6.

Importance of Learner-Instructor Interaction: Percent and Descriptive Statistics

Approach	Responses (N)	Very important	Somewhat important	Of little importance	Not important	*M (SD)*
E-mail	41	34%	44%	20%	2%	3.09 (.80)
Face-to-face	10	50%	30%	20%	0%	3.30 (.82)
Postal mail	36	36%	31%	19%	14%	2.88 (1.06)
Print study guide	35	80%	11%	3%	6%	3.65 (.80)
Telephone	41	39%	51%	5%	5%	3.24 (.77)

Comparing means, it appears that faculty perceive print study guides as most important to helping learning happen. Face-to-face meetings and telephone also received mean ratings of over 3.0, indicating that faculty place some importance on these approaches to learner-instructor interaction. However, just 25% of faculty report using face-to-face meetings. Postal mail is rated lowest for importance, though there is considerable variance in this result.

Calculating an overall rating for subjects' attitudes toward learner-instructor interaction, based on the mean rating for satisfaction (*M* 3.20, *SD* .31) and importance (*M* 3.20, *SD* .28) suggests that faculty value learner-instructor interaction highly. In addition, the means for satisfaction and perceived importance are the same, with similar low variance. Undergraduate faculty at AU are very satisfied with learner-instructor interaction and perceive it to be very important to helping learning happen. They are most satisfied with face-to-face meetings and print study guides. They are least satisfied with postal mail.

Faculty perceive print study guides to be the most important approach to helping learning happen and postal mail least important.

Attitudes and delivery mode. What effect does delivery mode have on this picture of faculty attitudes toward learner-instructor interaction? Table 7 illustrates subjects' attitudes (satisfaction and perceived importance) regarding approaches to learner-instructor interaction, organized by main delivery mode.

Comparing means presented in Table 7, those faculty who use print for delivery are most satisfied with face-to-face approaches to learner-instructor interaction, though this result is based on a small number of subjects (n = 6). Twenty six of the faculty who teach via print are also quite satisfied with their use of print study guides. Postal mail, used by 27 subjects, is rated lowest for satisfaction overall. Not surprisingly, faculty who teach via print see print study guides as the most important learner-instructor interaction approach when it comes to helping learning happen. While these faculty perceive e-mail as least important to helping learning happen, a considerable number of faculty report using e-mail (n = 29). It appears that even for those who use print as their main mode of delivery, e-mail is commonly used and a number of these subjects perceive it as reasonably important. What is perhaps more surprising is the level of importance placed on face-to-face meetings by six faculty who use print as their main mode of delivery.

The faculty who teach via mixed print and online delivery are most satisfied with telephone as an approach to learner-instructor interaction and least satisfied with postal mail. They report the telephone as the most important approach to learner-instructor interaction in

Table 7.

Attitudes Regarding Learner-Instructor Interaction: by Main Delivery Mode

Approach	Print delivery			Online delivery			Mixed mode delivery		
	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)
E-mail	29	3.00 (.71)	2.86 (.74)	6	3.83 (.41)	3.83 (.41)	6	3.33 (.52)	3.50 (.84)
Face-to-face	6	3.50 (.55)	3.33 (.82)	0	--	--	4	3.50 (1.00)	3.25 (.96)
Postal mail	27	2.96 (.81)	3.11 (.93)	3	2.67 (1.53)	2.67 (1.53)	6	1.50 (.55)	2.00 (1.10)
Print study guide	26	3.42 (.58)	3.81 (.49)	3	2.67 (1.53)	3.00 (1.73)	6	3.17 (1.17)	3.33 (1.21)
Telephone	29	3.28 (.84)	3.31 (.54)	6	2.67 (1.21)	2.50 (1.38)	6	3.67 (.52)	3.67 (.52)

terms of helping learning happen and postal mail as least important. As this group of faculty employs mixed print/online mode for delivery, it is surprising that they report neither print study guides nor e-mail (the two approaches most closely aligned with print and online modes) as the approaches they are most satisfied with or perceive as most important to helping learning happen.

Experience and attitudes. Table 8 illustrates subjects' attitudes regarding approaches to learner-instructor interaction, according to their level of experience as AU faculty.

Comparing means according to the number of years experience a subject has at AU, new faculty are most satisfied with face-to-face approaches to learner-instructor interaction, though this result is based on a small number (n = 5) of reports. Faculty classified as "new" are least satisfied with postal mail, a result that is based on a greater number of reports (n = 18). These faculty perceive print study guides as most important to helping learning happen, a result that is consistent with the large number of subjects (n = 12) in this group who use print as their main delivery mode. For new staff, postal mail is seen as least important.

Most of the experienced staff report their greatest satisfaction is with print study guides. These faculty are least satisfied with telephone and just slightly more satisfied with e-mail. Experienced staff report print study guides as most important. Experienced staff perceive the telephone as the approach to learner-instructor interaction that is least important to helping learning happen. It is important to note that two thirds of the subjects classified as "experienced" faculty report print as their main mode of delivery. Therefore, their reports of satisfaction with and perceived importance of print study guides are likely to be expected. However, save for a single report of face-to-face meetings, these experienced faculty do not report their satisfaction with or perceived importance of any two-way communication

Table 8.

Attitudes Regarding Learner-Instructor Interaction: by Level of Experience

Approach	New faculty			Experienced faculty			Very experienced faculty		
	N	Satisfaction M(SD)	Importance M(SD)	N	Satisfaction M(SD)	Importance M(SD)	N	Satisfaction M(SD)	Importance M(SD)
E-mail	19	3.21 (.71)	3.16 (.96)	8	2.88 (.99)	3.13 (.83)	14	3.29 (.47)	3.00 (.55)
Face-to-face	5	3.80 (.45)	3.20 (.84)	1	4.00[a]	4.00[a]	4	3.00 (.82)	3.25 (.96)
Postal mail	18	2.50 (1.10)	2.72 (1.07)	6	3.33 (.82)	3.50 (.84)	12	2.67 (.78)	2.83 (1.11)
Print study guide	17	3.29 (.77)	3.47 (1.01)	6	3.83 (.41)	4.00 (.00)	12	3.33 (.65)	3.75 (.62)
Telephone	19	3.32 (.82)	3.37 (.83)	8	2.88 (.64)	3.00 (.93)	14	3.35 (.63)	3.21 (.58)

[a] as n=1, no standard deviation is reported, and values for satisfaction and importance are actual, rather than mean.

approaches (e-mail, telephone, even postal mail) as highly as they do the print study guides. As an approach to learner-instructor interaction, print study guides allow the least input and control by the learner.

Very experienced staff are most satisfied with telephone and print study guides as approaches to learner-instructor interaction. The mean ratings on these two traditional approaches to learner-instructor interaction for print-based individualized study are similar and without extreme variance. These very experienced faculty are least satisfied with postal mail as an approach to learner-instructor interaction. They perceive print study guides as most important to helping learning happen and postal mail as least. These results are not surprising, given that 11 of the 13 faculty classified as "very experienced" report print as their main mode of delivery. However, it is important to note that even when print study guides are written in a conversational tone and include didactic questions, print is largely a one-way (instructor to learner) approach to learner-instructor interaction.

Like the faculty involved in Landstrom's (1995) study who reported that contact with students was the "major reward for teaching in-class" (p. 152), it appears that AU faculty also value learner-instructor interaction highly. However, unlike Landstrom's subjects, who perceived "lack of contact [with students as]…the major drawback for distance courses" (p. 152), the levels of satisfaction reported by AU faculty in this study indicates that they do not see the type or degree of interaction they have with students to be a major drawback to their practice.

Actions Regarding Learner-Instructor Interaction

The preceding analysis of faculty attitudes toward learner-instructor interaction indicates that this type of interaction is highly valued, when satisfaction (*M* 3.20, *SD* .31) and

importance (*M* 3.23, *SD* .28) are combined. So, despite the variety of approaches faculty choose or use, they appear to place considerable value on learner-instructor interaction. How are these attitudes demonstrated in practice?

All respondents report using e-mail and telephone for learner-instructor interaction. Of these two approaches, frequent telephone use is slightly higher than e-mail, with 88% (n = 36) of respondents using telephone very frequently (n = 22; 54%) or frequently (n = 14; 34.1%). A total of 35 respondents (85%) report using e-mail either very frequently (n = 23; 56%) or frequently (n = 12; 29%). Of the 36 faculty who use postal mail (a slower and less immediate approach to interaction than either e-mail or telephone), only 24 (67%) use this approach very frequently or frequently. However, 94% (33 of 35) of faculty who use the print study guide for learner-instructor interaction make very frequent or frequent use of this approach. While the use of guided didactic questions and conversational tone may enhance the interactive qualities of the printed study guide, it is essentially a one-way approach to interaction, from instructor to learner. Of the few faculty (n = 11) who report using face-to-face meetings for learner-instructor interaction, most (n = 8; 73%) report that they seldom use this approach to facilitate interaction with learners. So, despite reports of face-to-face meetings as valued (mean satisfaction and importance) this approach is seldom used.

Just as with attitudes, it is useful to consider some descriptive statistics regarding how frequently faculty use various approaches to learner-instructor interaction. Table 9 illustrates the number of responses to the question of how frequently an approach to learner-instructor interaction is used, as well as means and standard deviations for how frequently the various approaches are used.

Table 9.

Descriptive Statistics: How Frequently Learner-Instructor Interaction Approaches are Used

Approach	# of responses	*M*	*SD*
E-mail	41	3.39	.80
Face-to-face meetings	11	1.46	.93
Postal mail	36	2.94	1.15
Print study guide	35	3.80	.63
Telephone	41	3.34	.88

Apparently, print study guides are used most frequently, and face-to-face meetings are used least. While postal mail is not used frequently, there is considerable variance in this mean.

Frequency of use and delivery mode/experience. What effect does comparing means for mode of delivery and years of experience have on this picture of how frequently faculty use various approaches to learner-instructor interaction? Table 10 illustrates how frequently subjects use various approaches to learner-instructor interaction, organised by main delivery mode and level of experience at AU.

Not surprisingly, faculty who report using print for delivery also report using print study guides most frequently as an approach for learner-instructor interaction. Print study guides are closely followed by telephone as a frequently used approach. These faculty use face-to-face meetings very infrequently and despite considerable variance, the mean indicates that face-to-face meetings are seldom used.

Table 10.

How Frequently Learner-Instructor Interaction Approaches are Used: by Delivery Mode and

Experience

	Main delivery mode								
	Print delivery			Online delivery			Mixed mode delivery		
Approach	N	*M*	*SD*	N	*M*	*SD*	N	*M*	*SD*
E-mail	29	3.14	.83	6	4.00	.00	6	4.00	.00
Face-to-face	7	1.71	1.11	0	--	--	4	1.00	.00
Postal mail	27	3.33	.96	3	2.00	1.00	6	1.67	.82
Print study guide	26	3.92	.27	3	2.44	1.53	6	4.00	.00
Telephone	29	3.59	.57	6	2.00	1.26	6	3.50	.55

	Level of experience (in years)								
	New (less than 5)			Experienced (5 to 10)			Very experienced (over 10)		
Approach	N	*M*	*SD*	N	*M*	*SD*	N	*M*	*SD*
E-mail	19	3.63	.68	8	3.25	.89	14	3.14	.86
Face-to-face	5	1.20	.45	2	2.50	2.12	4	1.25	.50
Postal mail	18	2.83	1.15	6	3.50	1.23	12	2.83	1.12
Print study guide	17	3.65	.86	6	4.00	.00	12	3.92	.29
Telephone	19	3.37	.96	8	3.13	1.13	14	3.43	.65

Faculty who deliver online use e-mail with the greatest frequency as an approach to

learner-instructor interaction. They use the telephone and postal mail least often.

Faculty who teach via mixed print/online mode use both print study guides and e-mail

approaches most frequently for learner-instructor interaction. This is consistent with the

picture of these faculty using print and online delivery in equal measure. Faculty who teach

via mixed mode use face-to-face meetings least often, closely followed by postal mail. It would be interesting to follow up this research by asking how faculty receive submissions from students (e.g., assignments, etc.), whether by fax or as e- mail attachments. During the process of content validation with AU course coordinators, neither e-mail attachment nor fax was suggested as an approach to learner-instructor interaction. However, the presence of e-mail as a frequently used approach by the mixed mode faculty suggests that e-mail may be used for submitting and returning student assignments.

Subjects classified as "new" faculty use print study guides most frequently. E-mail is used nearly as frequently as print study guides. New faculty report face-to-face meetings as the learner-instructor interaction approach used least often.

Subjects classified as "experienced" faculty report print study guides as the approach used most frequently for learner-instructor interaction. Face-to-face meetings are the approach they use least often. Note that there is considerable variance in this mean.

Finally, print study guides are the approach used most frequently by subjects classified as "very experienced" faculty. This group uses face-to-face meetings least often for learner-instructor interaction.

Correlations in Learner-Instructor Interaction

This study set out to determine whether there were any correlations between frequency of use and either satisfaction or perceived importance. We might also expect the two factors associated with attitude (satisfaction with use and perceived importance to helping learning happen) to be correlated. Within the set of information related to learner-instructor interaction, there are a variety of correlations. The following is a report of the

results of Pearson's correlation, with a significance level of .05. Results for correlations

which were not statistically significant (where $p > .05$) can be found in Appendix F.

For e-mail, frequency of use is positively correlated to perceived importance ($r = .406$, $p = .008$). There is a positive correlation between frequency of use and satisfaction ($r = .366$, $p = .019$). Finally, there is a positive correlation between perceived importance and satisfaction ($r = .636$, $p < .001$).

In the case of face-to-face meetings, there is a positive correlation between perceived importance and satisfaction ($r = .668$, $p = .035$).

There is a positive correlation between how frequently faculty use postal mail and both satisfaction with use ($r = .468$, $p = .004$) and perceived importance ($r = .722$, $p < .001$). In addition, there is a positive correlation between perceived importance and satisfaction ($r = .624$, $p < .001$).

There is a positive correlation between how frequently the print study guide is used and perceived importance ($r = .498$, $p = .002$) as well as between satisfaction with use and perceived importance ($r = .676$, $p < .001$).

For telephone, there is a positive correlation between how frequently this approach is used, and both satisfaction with use ($r = .485$, $p = .001$) and perceived importance ($r = .648$, $p < .001$). In addition, there is a positive correlation between perceived importance and satisfaction ($r = .824$, $p < .001$).

Learner-instructor interaction is highly valued by the subjects in this study, regardless of their mode of delivery or years of experience. More subjects responded with more approaches to learner-instructor interaction than any other type of interaction studied. E-mail, postal mail, print study guide, and telephone are used very frequently for learner-instructor

interaction. For all five approaches to learner-instructor interaction, subjects' level of satisfaction is positively correlated with their perceptions of how important the approach is to helping learning happen. For all but face-to-face meetings, there is also a positive correlation between frequency of use and perceived importance to helping learning happen.

Learner-Content Interaction

For this study, learner-content interaction is defined as the "process of intellectually interacting with content that results in changes of the learner's understanding…perspective or cognitive structures of the learner's mind" (Moore, 1989, p. 2). In the survey form, a paraphrased form of this operational definition was provided. Faculty were asked to consider learner-content interaction taking place between a learner and subject matter/content and resulting in changes in the learner's level of knowledge, understanding, perspective, and so forth.

Approaches to Learner-Content Interaction

Faculty were provided five possible approaches for learner-content interaction (multimedia on CD-ROM, multimedia on the Internet, print student manual, print study guide, and video recordings). Faculty suggested nine "other" approaches for learner-content interaction in addition to the list provided in the survey, including: (a) data from websites (n = 2); (b) floppy disks (n = 2); (c) online study guides (n = 2); (d) textbooks (n = 2); (e) online student manual (n = 1); (f) in-person labs (n = 1); (g) home labs (n = 1); (h) audio tapes (n = 4); and (i) television (n = 1). The frequency distribution of reported use of the various approaches for learner-content interaction is depicted in Table 11.

Unlike learner-instructor interaction, there are no approaches to learner-content interaction that are used by all faculty. The print approaches (study guide and student

manual) each received nearly the same number of responses, and together these two

approaches account for just over half the subjects' learner-content interaction activity. The

total reports of "other" approaches were greater than multimedia in either CD-ROM format

or on the Internet.

Table 11.

Frequency Distribution of Approaches to Learner-Content Interaction

Approach	# of responses	Percent	Cumulative percent
Multimedia (on CD)	8	6	6
Multimedia (WWW)	12	9	15
Print student manual	35	27	42
Print study guide	36	27	69
Video recordings	25	19	88
Other	16	12	100
Total	132	100	100

Attitudes Toward Learner-Content Interaction

In order to determine faculty attitudes, subjects were asked how satisfied they were

with their use of an approach, as well as how important they felt each approach was to

helping learning happen.

Satisfaction. Generally, faculty are very or somewhat satisfied with their use of print

study guides (92%), print student manuals (94%), and video recordings (84%). Faculty are

much less satisfied with multimedia approaches; 62% are somewhat or very dissatisfied with

the CD-ROM form, and 33% are similarly dissatisfied with multimedia on the Internet.

However, the number of faculty who report using these approaches is much smaller than for

the print and video approaches. Table 12 illustrates the frequency distribution and descriptive statistics regarding subjects' satisfaction with approaches to learner-content interaction.

Table 12.

<u>Satisfaction with Learner-Content Interaction: Percent and Descriptive Statistics</u>

Approach	Responses (N)	Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	*M (SD)*
Multimedia (on CD)	8	13%	25%	50%	12%	2.37 (.92)
Multimedia (WWW)	12	50%	17%	25%	8%	3.08 (1.08)
Print student manual	35	51%	43%	3%	3%	3.42 (.70)
Print study guide	36	53%	39%	5%	3%	3.41 (.73)
Video recordings	25	32%	52%	16%	0%	3.16 (.69)

The two print approaches (study guide and student manual) are rated highest for satisfaction. In addition, these approaches are used by nearly all (35/41 and 36/41) faculty. Faculty report the lowest levels of satisfaction with their use of multimedia, both on CD-ROM (though the number of reports is small) and the Internet. The means for multimedia also exhibit more variance than do the means for the other approaches to learner-content interaction.

<u>Importance</u>. Faculty report that the two print approaches are important. Nearly 95% of subjects rate the study guide in particular as very or somewhat important, with 86% giving the print student manual a similarly important rating. On the other hand, only 50% of faculty rate multimedia on CD-ROM as very or somewhat important, a rating given to video recordings by 28% of faculty. Table 13 illustrates the frequency distribution and descriptive

statistics regarding subjects' perceived importance of approaches to learner-content interaction.

Table 13.

Importance of Learner-Content Interaction: Percent and Descriptive Statistics

Approach	Responses (N)	Very important	Somewhat important	Of little importance	Not important	M (SD)
Multimedia (on CD)	8	13%	37%	50%	0%	2.62 (.74)
Multimedia (WWW)	12	42%	42%	16%	0%	3.25 (.57)
Print student manual	35	49%	37%	14%	0%	3.34 (.73)
Print study guide	36	72%	22%	6%	0%	3.66 (.59)
Video recordings	25	28%	44%	28%	0%	3.00 (.76)

Comparing means, it appears that the print approaches (used by most faculty) are also perceived as most important for helping learning happen. Multimedia on CD-ROM is rated lowest for importance, of the approaches faculty use for learner-content interaction.

Calculating an overall rating for satisfaction (*M* 3.08, *SD* .43) and importance (*M* 3.17, *SD* .39) suggests that learner-content interaction is highly valued. Means for both indicators of attitude are only slightly less for learner-content interaction than for learner-instructor interaction, though the *SD* for both indicators of attitude (importance .39; satisfaction .43) for learner-content interaction are slightly greater than for learner-instructor (importance .28; satisfaction .31), indicating slightly more variance. Undergraduate faculty at AU are very satisfied with learner-content interaction and perceive it to be very important to helping learning happen. They are most satisfied with the print student manual and print study guide and least satisfied with multimedia in CD-ROM format. Faculty perceive the

print study guide to be the most important approach to helping learning happen and multimedia in CD-ROM format least important.

Attitudes and delivery mode. What effect does main delivery mode have on this picture of subjects' attitudes toward learner-content interaction? Table 14 illustrates subjects attitudes regarding approaches to learner-content interaction, organised by main delivery mode.

Comparing means, those faculty who use print for delivery are most satisfied with both the print student manual and study guide. These two approaches are used by all faculty who report print as their main mode of delivery. Faculty are least satisfied with multimedia in CD-ROM format and on the Internet. However, the number of responses for both multimedia in CD-ROM format (n = 4) and for multimedia on the Internet (n = 7) is small. Faculty also perceive the two print approaches (study guide and student manual) as important to helping learning happen. Multimedia in CD-ROM format is perceived by these subjects to be the approach least important to helping learning happen. Faculty who use print for delivery value print approaches to learner-content interaction highest, with various forms of multimedia valued somewhat less.

The faculty in this study who teach online rate highly all the approaches to learner-content interaction. However, it must be noted that there is only one subject's response for all the approaches, except multimedia on the Internet (where n = 3). There are six subjects who report online as their main mode of delivery. It is difficult to draw conclusions about the group's satisfaction with approaches to learner-content interaction on the basis of such limited data. There are similarly small numbers regarding perceived importance to helping

Table 14.

Attitudes Regarding Learner-Content Interaction: by Main Delivery Mode

Approach	Print delivery			Online delivery			Mixed mode delivery		
	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)
Multimedia (on CD)	4	2.5 (.58)	2.5 (.58)	1	4.0[a]	4.0[a]	3	1.67 (.58)	2.33 (.58)
Multimedia (WWW)	7	2.86 (.90)	2.86 (.69)	3	4.0 (.00)	4.0 (.00)	2	2.5 (2.12)	3.5 (.71)
Print student manual	29	3.48 (.58)	3.38 (.68)	1	4.0[a]	2.0[a]	5	3.0 (1.22)	3.4 (.89)
Print study guide	29	3.45 (.63)	3.72 (.53)	1	4.0[a]	4.0[a]	6	3.17 (1.17)	3.33 (.82)
Video recordings	20	3.15 (.67)	3.05 (.76)	1	4.0[a]	4.0[a]	4	3.0 (.82)	2.5 (.58)

[a] as n=1, no standard deviation is reported, and values for satisfaction and importance are actual, rather than mean.

learning happen, where all approaches except the printed student manual are rated highly. The student manual is perceived as being of little importance. Again, it is difficult to come to conclusions on the basis of such a small number of reports (n = 1) for all approaches but multimedia on the Internet (n = 3).

Faculty who mix print and online modes of delivery are most satisfied with their use of print study guides, student manuals and video. They report multimedia on CD-ROM as the approach to learner-content interaction that they are least satisfied with. These subjects rate multimedia on the Internet as the approach most important to helping learning happen, though the number of reports for this approach is small (n = 2). Most mixed mode faculty make use of the print student manual (n = 5) and study guide (n = 6), and they rate these approaches almost as highly as multimedia on the Internet, when it comes to perceived importance to helping learning happen. Faculty who deliver via mixed modes rate multimedia on CD-ROM as the approach to learner-content interaction least important to helping learning happen. As this group reports both print and online as their main mode of delivery, it is not surprising that the approaches they value most for learner-content interaction are print (study guide and student manual) and online (multimedia on the Internet). Two thirds of this small group (4/6) are somewhat satisfied with video recordings for learner-content interaction. Multimedia on CD-ROM is not seen as particularly satisfying or important.

Experience and attitudes. Table 15 illustrates subjects' attitudes regarding approaches to learner-content interaction, organized by level of experience.

Comparing means according to the number of years a subject has as an Athabasca

Table 15.

Attitudes Regarding Learner-Content Interaction: by Level of Experience

	New faculty			Experienced faculty			Very experienced faculty		
		Satisfaction	Importance		Satisfaction	Importance		Satisfaction	Importance
Approach	N	M (SD)	M (SD)	N	M (SD)	M (SD)	N	M (SD)	M (SD)
Multimedia (on CD)	5	2.40 (1.14)	2.80 (.84)	2	2.50 (.71)	2.50 (.71)	1	2.00[a]	2.00[a]
Multimedia (WWW)	6	3.17 (1.33)	3.67 (.52)	2	3.50 (.71)	3.00 (.00)	4	2.75 (.96)	2.75 (.96)
Print student manual	15	3.20 (.86)	3.07 (.70)	6	3.50 (.55)	3.50 (.84)	14	3.64 (.50)	3.57 (.65)
Print study guide	16	3.25 (.86)	3.50 (.63)	6	3.67 (.52)	4.0 (.00)	14	3.50 (.65)	3.71 (.61)
Video recordings	11	3.45 (.52)	3.36 (.67)	5	3.20 (.84)	3.20 (.84)	9	2.78 (.67)	2.44 (.53)

[a] as n=1, no standard deviation is reported, and values for satisfaction and importance are actual, rather than mean.

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University faculty member, new faculty are most satisfied with video and least with multimedia on CD-ROM. However, the number of responses for both video (n = 11) multimedia on CD-ROM (n = 5) suggests that more results are needed to complete the picture. Of the 19 new faculty (total number), 16 are quite satisfied with the print study guide and 15 with the student manual. These new faculty report multimedia on the Internet as the approach they perceive as most important to helping learning happen. Multimedia on CD is perceived as least important.

Those subjects classified as "experienced" report the greatest level of satisfaction with print forms (study guide and student manual) as well as multimedia on the Internet. However, with this latter approach, it is important to note that the number of responses is very small (n = 2) compared to the print approaches (n = 6). Experienced faculty are least satisfied with multimedia on CD-ROM. In terms of perceived importance, the other factor in determining attitudes, experienced faculty perceive the print study guide to be most important to helping learning happen, with multimedia on CD-ROM least.

The subjects classified as "very experienced" are most satisfied with the study guide and student manual, both print approaches to learner-content interaction. Except the lone rating of 2.0 for multimedia on CD-ROM by one subject, very experienced faculty are least satisfied with both video and multimedia on the Internet. These faculty perceive the two print approaches (study guide and student manual) as most important. Again, the single report of multimedia in CD-ROM format may be misleading. A larger number of this "very experienced" group (n = 9) perceive video as least important to helping learning happen.

This analysis indicates that the subjects in this study generally place high value on learner-content interaction. Considering the overall levels of satisfaction (*M* 3.08, *SD* .43)

and perceived importance (*M* 3.17, *SD* .39) indicates that faculty attitudes toward learner-content interaction are only slightly less than for learner-instructor interaction. However, the *SD* for the indicators of attitude (importance .39; satisfaction .43) for learner-content interaction are slightly greater than for learner-instructor (importance .28; satisfaction .31), indicating slightly more variance in overall attitude. However, in both types of interaction, variance is not extreme. These means indicate attitudes toward learner-content interaction range between satisfied and very satisfied, and between important and very important.

Actions Regarding Learner-Content Interaction

The subjects in this study provided a total of 132 responses for approaches used for learner-content interaction. This is 30% of total responses for the entire survey. In addition to the five approaches provided in the survey form, faculty added an additional nine in the category of "other" approaches. Therefore, the range of approaches for learner-content interaction is greater than for any other type of interaction studied here. Responses classified as "other" approaches account for 16 of the 132 total responses of approaches for learner-content interaction.

How frequently do faculty report using the various approaches for learner-content interaction? In addition to being used by the greatest number of faculty, the print approaches are also used frequently. Study guides are used very frequently by 35 (97%) of the faculty who report using this approach for learner-content interaction. Printed student manuals receive similar reports of very frequent use (n = 34; 97%). While 25 respondents report using video recordings, only 36% (n = 9) report very frequent or frequent use. Ten, or 40%, report occasional use of video and 6 (24%) describe their use of video as seldom. Of the eight reports of using multimedia on CD-ROM for learner-content interaction, only 2 (or 25%)

report frequent use. The remaining 75% is evenly divided between use described as occasional or seldom. The Internet is a more common venue for multimedia for learner-content interaction, and of the 12 reports by faculty, 50% are very frequent or frequent.

A useful starting point is to consider some descriptive statistics regarding how frequently faculty use various approaches to learner-content interaction. Table 16 presents means and standard deviations of how frequently the various approaches to learner-content interaction are used.

Table 16.

Descriptive Statistics: How Frequently Learner-Content Interaction Approaches are Used

Approach	# of responses	*M*	*SD*
Multimedia (on CD)	8	1.88	.83
Multimedia (WWW)	12	2.50	1.31
Print student manual	35	3.97	.17
Print study guide	36	3.97	.17
Video recordings	25	2.20	.91

Apparently, print forms are used very frequently, and multimedia forms least. Despite some variance, the ratings for how frequently these approaches are used are still quite low. The rating for multimedia on the Internet may be modified when reports of other online approaches contributed by subjects are factored in. These "other" approaches include:

- data from websites (n = 2),

- online study guides (n = 2), and

- online student manual (n = 1).

However, when responses for how frequently faculty use these other online approaches are included, neither the resulting mean (2.67) nor *SD* (1.32) are much different.

Frequency of use and delivery mode/experience. Table 17 illustrates the frequency with which subjects use approaches to learner-content interaction, organised by delivery mode and level of experience.

Table 17.

How Frequently Learner-Content Interaction Approaches are Used: by Delivery Mode and Experience

| | Main delivery mode | | | | | | | | |
| | Print delivery | | | Online delivery | | | Mixed mode delivery | | |
Approach	N	*M*	*SD*	N	*M*	*SD*	N	*M*	*SD*
Multimedia (on CD)	4	1.75	.96	1	3.00[a]	--	3	1.67	.58
Multimedia (WWW)	7	1.86	.90	3	4.00	.00	2	2.50	2.12
Print student manual	29	3.97	.19	1	4.00[a]	--	5	4.00	.00
Print study guide	29	3.97	.19	1	4.00[a]	--	6	4.00	.00
Video recordings	20	2.0	.80	1	4.00[a]	--	4	2.75	.96

| | Level of experience (in years) | | | | | | | | |
| | New (less than 5) | | | Experienced (5 to 10) | | | Very experienced (over 10) | | |
Approach	N	*M*	*SD*	N	*M*	*SD*	N	*M*	*SD*
Multimedia (on CD)	5	2.00	1.00	2	1.50	.71	1	2.00[a]	--
Multimedia (WWW)	6	2.83	1.47	2	1.50	.71	4	2.50	1.29
Print student manual	15	4.00	.00	6	4.00	.00	14	3.93	.27
Print study guide	16	4.00	.00	6	4.00	.00	14	3.93	.27
Video recordings	11	2.73	.91	5	1.80	.84	9	1.78	.67

[a] as n=1, no standard deviation is reported, and value for frequency is actual, rather than mean.

Faculty who deliver via print mode use print approaches very frequently. Multimedia approaches, whether in CD-ROM format or on the Internet, are used least often. Even including "other" online approaches used by those who deliver via print does not alter the figure appreciably.

There were few responses from faculty who teach online, with just one subject responding for use of all approaches except multimedia on the Internet. This one subject uses multimedia in CD-ROM format frequently, while also using the print study guide, print student manual and video very frequently. Not surprisingly, three of the six online faculty use multimedia on the Internet very frequently. When the three "other" approaches of online study guide and student manual used by online teachers are included, this figure does not change.

Of the six faculty who teach via mixed mode, most report using the print study guide (n = 6) and print student manual (n = 5) most frequently. Interestingly, the online approach of multimedia on the Internet is not used frequently, though caution is advised here because there is considerable variance and a low number (n = 2). Those who teach via mixed mode use multimedia on CD-ROM least often.

Regardless of their level of experience as AU faculty, all subjects report using print approaches to learner-content interaction very frequently. Results vary slightly between groups:

- "new" faculty – both study guide and student manual (*M* 4.00, *SD* .00),
- "experienced" faculty – both study guide and student manual (*M* 4.00, *SD* .00), and
- "very experienced" faculty – both study guide and student manual (*M* 3.93, *SD* .27).

New faculty use multimedia on CD-ROM least. Experienced faculty make little use of multimedia, either in CD-ROM format or on the Internet. Subjects classified as "very experienced" use video least often.

<u>Correlations in Learner-Content Interaction</u>

This study set out to determine whether there were any correlations between frequency of use of approaches and either satisfaction or perceived importance. We might also expect the two factors associated with attitude (satisfaction with use and perceived importance to helping learning happen) to be correlated. Within the set of information related to learner-content interaction, there are a variety of correlations. The following is a report of the results of Pearson's correlation, with a significance level of .05. Results for correlations which were not statistically significant (where $p > .05$) can be found in Appendix F.

In the case of multimedia on the Internet, frequency of use is positively correlated with both satisfaction with use ($r = .734$, $p = .007$) and perceived importance ($r = .780$, $p = .003$). In addition, there is a positive correlation between perceived importance and satisfaction ($r = .751$, $p = .005$).

For the printed student manual, there is a positive correlation between satisfaction with use and perceived importance to helping learning happen ($r = .398$, $p = .018$).

With the printed study guide, there is a positive correlation between satisfaction with use and perceived importance to helping learning happen ($r = .800$, $p < .001$).

With video recordings, there is a positive correlation between frequency and satisfaction with use ($r = .478$, $p = .016$). In addition, there is a positive correlation between satisfaction with use and perceived importance to helping learning happen ($r = .634$, $p = .001$).

Learner-content interaction is highly valued by these faculty, though their attitude ratings for learner-content interaction are slightly less than for learner-instructor interaction. Those faculty who report online as their main mode of delivery report higher satisfaction and importance ratings for approaches to learner-content interaction. Print student manuals and study guides are used very frequently by nearly all faculty to provide for and facilitate this type of interaction. Video and multimedia on the Internet are also used frequently, though not as often as the print forms, or by as many faculty. There are not as many correlations among the variables and approaches for learner-content interaction as there are for learner-instructor interaction. For multimedia on the Internet, frequency of use is positively correlated with both satisfaction and perceived importance. Frequency of use of video recordings is positively correlated with satisfaction.

<div align="center">Learner-Interface Interaction</div>

For this study, learner-interface interaction is defined as interaction between the learner and a "technological medium in order to interact with the content, instructor or other learners" (Hillman et al., 1994, p. 33). In the survey form, a paraphrased version of this operational definition was provided. Respondents were asked to consider learner-interface interaction taking place between a learner and a technological medium, in order for learners to interact with the content, instructor or other learners.

Approaches to Learner-Interface Interaction

Faculty were provided five possible approaches for learner-interface interaction (face-to-face orientation session, print instructions or tutorial, referral to Athabasca University helpdesk, multimedia on the Internet, and a technology course prerequisite). There was also space for subjects to add up to two "other" approaches. Faculty suggested seven approaches

for learner-instructor interaction in addition to the list provided in the survey. These other approaches, with the number of reports in parentheses, include: (a) direct students to other resources (n = 1); (b) refer to virtual helpdesk (n = 3); (c) face-to-face in a lab (n = 1); (d) floppy disk (n = 1); (e) home lab materials (n = 1); (f) multimedia on CD-ROM (n = 1); and (g) refer to library (n = 1). Table 18 presents the frequency distribution of the approaches for learner-interface interaction.

Table 18.

Frequency Distribution of Approaches to Learner-Interface Interaction

Approach	# of responses	Percent	Cumulative percent
Face-to-face orientation	5	6	6
Multimedia (WWW)	14	18	24
Print instructions/tutorial	29	38	62
Refer to AU helpdesk	16	21	83
Technology course prereq.	5	7	90
Other	8	10	100
Total	77	100	100

Print instructions/tutorials are the most commonly used approach to learner-interface interaction, and over 90% of faculty use this approach frequently. Reports of the frequency with which multimedia resources on the Internet are used as an approach for learner-interface interaction range widely: 29% (n = 4) very frequent, 36% (n = 5) frequent, 21% (n = 3) occasional and 14% (n = 2) seldom. While requiring a technology course prerequisite is not commonly used, 80% (n = 4) of the faculty who use this approach do so frequently. Face-to-

face orientation is also a seldom-reported approach, and in this small group (n = 5), 80%
report that this approach is seldom used.

Attitudes Toward Learner-Interface Interaction

In addition to determining which approaches faculty use, this study also considered
subjects' attitudes (reported levels of satisfaction and perceived importance) toward learner-
interface interaction. To determine these attitudes, faculty were asked how satisfied they
were with their use of each approach, as well as how important they felt each approach was
to helping learning happen.

Satisfaction. All faculty who use either face-to-face orientation sessions, referral to
the AU helpdesk or requirement of a technology course prerequisite are very or somewhat
satisfied with these approaches. No faculty report being very dissatisfied with their use of
any approaches for learner-interface interaction. Table 19 illustrates the frequency
distribution and descriptive statistics regarding subjects' satisfaction with approaches to
learner-interface interaction.

Table 19.

Satisfaction with Learner-Interface Interaction: Percent and Descriptive Statistics

Approach	Responses (N)	Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	M (SD)
Face-to-face	5	60%	40%	0%	0%	3.60 (.55)
Multimedia (WWW)	14	29%	50%	21%	0%	3.07 (.73)
Print tutorials	29	41%	45%	14%	0%	3.27 (.70)
Refer to helpdesk	15	47%	53%	0%	0%	3.46 (.52)
Technology course	5	60%	40%	0%	0%	3.60 (.55)

Comparing means, it appears that both face-to-face orientation sessions, and having a technology course as a prerequisite, are the two approaches to learner-interface interaction that faculty are most satisfied with, though these results are based on a small number of subjects. Multimedia on the Internet is the approach faculty are least satisfied with. It appears that faculty are generally satisfied with all five approaches for learner-interface interaction.

Importance. Many of the subjects (80%) who use a technology course prerequisite as an approach to facilitate learner-interface interaction report that it is very important to helping learning happen, and all these faculty see it as at least somewhat important. While face-to-face orientation is perceived as very or somewhat important by 83% of respondents, the remaining 17% rate this approach as not important. Over 25% of those faculty who use multimedia on the Internet as an approach to facilitate learner-interface interaction rate it as being of little importance.

Table 20 illustrates the frequency distribution and descriptive statistics regarding subjects' reports of how important various approaches to learner-instructor interaction are to helping learning happen.

Comparing means, it appears that faculty find a technology course as a prerequisite to be the most important approach to helping learning happen and face-to-face orientation least important. However, the means for all approaches to learner-interface interaction are above 3.0, suggesting that faculty perceive all approaches as important to helping learning happen.

Calculating an overall rating for satisfaction (M 3.40, SD .23) and importance (M 3.37, SD .29) suggests that faculty value learner-interface interaction highly. This overall rating is nearly the same as for learner-instructor interaction (for which satisfaction is rated M3.20, SD .31, and importance rated M 3.23, SD .28) and slightly greater than for learner-

content interaction (for which satisfaction is rated M 3.08, SD .43, and importance rated M

3.17, SD .39).

Table 20.

Importance of Learner-Interface Interaction: Percent and Descriptive Statistics

Approach	Responses (N)	Very important	Somewhat important	Of little importance	Not important	M (SD)
Face-to-face	6	50%[a]	33%	0%	17%	3.16 (1.17)
Multimedia (WWW)	14	36%	36%	28%	0%	3.07 (.83)
Print tutorials	28	61%[b]	29%	7%	3%	3.46 (.79)
Refer to helpdesk[c]	13	46%	46%	8%	0%	3.38 (.65)
Technology course	5	80%	20%	0%	0%	3.80 (.45)

[a]one subject who perceives face-to-face orientation as very important did not indicate using this

approach. If this response is removed from the data, the actual rates become: very important -- 40%;

important -- 40%; not important -- 20%.

[b]one subject who uses print instructions/tutorials frequently and provided a rating of very satisfied did

not provide a rating of importance for this approach.

[c]one subject who refers learners to AU's helpdesk did not rate either satisfaction or importance. An

additional two subjects who use this approach and provided a rating for satisfaction did not provide a

rating for importance.

Undergraduate faculty at AU are very satisfied with learner-interface interaction and

perceive it to be very important to helping learning happen. They are most satisfied with a

technology course prerequisite and face-to-face orientation and least satisfied with

multimedia on the Internet. Faculty perceive a technology course prerequisite to be the most

important approach to helping learning happen. The mean for this approach suggests that

many faculty share the perception of a technology course as very important. Multimedia on the Internet is perceived as least important to helping learning happen.

Delivery mode and attitudes. What effect does delivery mode have on this picture of faculty attitudes toward learner-interface interaction? Table 21 illustrates subjects' attitudes regarding approaches to learner-interface interaction, organised by main delivery mode. Comparing means, those faculty who use print for delivery are most satisfied with face-to-face orientation for learner-interface interaction. They are also quite satisfied with referral to AU helpdesk and print tutorials. These faculty are least satisfied with multimedia on the Internet. When it comes to perceptions of importance, faculty who deliver via print rate all approaches quite highly except multimedia on the Internet. While these faculty do not rate print tutorials highest for importance, 22 of the subjects who deliver via print use print tutorials for learner-interface interaction, and the mean rating for importance by these subjects is quite high. Of the remaining approaches, use of a technology course as a prerequisite, referral to AU helpdesk, and face-to-face orientation are all rated highly for importance.

Faculty in this study who teach online are most satisfied with the approach of requiring a technology course as a prerequisite. They do not report a satisfaction level for face-to-face orientation, and report being quite satisfied with their use of the other three approaches to learner-interface interaction, including multimedia on the Internet, as well as referral to the Athabasca University helpdesk and print tutorials. One online teacher perceives both face-to-face orientation and a technology course prerequisite as the approaches to learner-interface interaction that are most important to helping learning happen. Four subjects also perceive multimedia on the Internet as important. Print tutorials

Table 21.

Attitudes Regarding Learner-Interface Interaction: by Main Delivery Mode

Approach	Print delivery			Online delivery			Mixed mode delivery		
	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)
Face-to-face	3	3.67 (.58)	3.67 (.58)	1	--[a]	4.00	2	3.50 (.71)	2.00 (1.41)
Multimedia (WWW)	6	2.67 (.52)	2.67 (.52)	4	3.50 (1.00)	3.50 (1.00)	4	3.25 (.50)	3.25 (.96)
Print tutorial	22	3.09 (.68)	3.36 (.85)	2	3.50 (.71)	3.00 (.00)[b]	5	4.00 (.00)	4.00 (.00)
Refer to helpdesk	9	3.44 (.53)	3.38 (.74)[c]	2	3.50 (.71)	3.00 (.00)[d]	4	3.50 (.58)	3.50 (.58)
Technology course	3	3.00 (.00)[e]	3.67 (.58)	2	4.00 (.00)	4.00 (.00)[d]	1	4.00[f]	3.00[f]

[a] subject did not indicate satisfaction, and as n=1, value for importance is actual rather than mean and no standard deviation is reported.

[b] based on one subject only.

[c] based on eight subjects only.

[d] based on one subject only.

[e] based on two subjects only.

[f] as n=1, values for importance and satisfaction are actual rather than mean, and no standard deviation is reported.

and referral to the Athabasca University helpdesk are considered least important, though this is based on a response from just one subject.

Faculty who mix print and online delivery are most satisfied with print tutorials as an approach to facilitate learner-interface interaction, a result based on responses from five subjects. A comparable level of satisfaction is reported for requiring a technology course as a prerequisite, though by only one subject. Faculty who teach via mixed mode are also quite satisfied with both face-to-face orientation and referral to the Athabasca University helpdesk. These faculty are least satisfied with multimedia on the Internet as an approach to learner-interface interaction. Faculty who teach via mixed mode perceive print tutorials as most important to helping learning happen and face-to-face orientation as least important.

Experience and attitudes. Table 22 illustrates subjects' attitudes regarding approaches to learner-interface interaction, organised by level of experience.

Comparing means according to number of years experience a subject has at AU, new faculty are most satisfied with face-to-face orientation and least satisfied with print tutorials. However, it is important to note that the range of ratings (most satisfied to least) by these "new faculty" subjects is small, from (M 3.67) for face-to-face orientation to (M 3.21) for print tutorials. The range of ratings for importance to helping learning happen is similarly narrow, from (M 3.50) for technology course prerequisite to (M 3.20) for multimedia on the Internet.

Experienced staff, those with 5 to 10 years experience, are most satisfied with use of a technology course as a prerequisite and least with multimedia on the Internet. This experienced group perceives three approaches to learner-interface interaction as most

Table 22.

Attitudes Regarding Learner-Interface Interaction: by Level of Experience

Approach	New faculty			Experienced faculty			Very experienced faculty		
	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)
Face-to-face	4	3.67 (.58)[a]	3.25 (1.50)	0	--	--	2	3.50 (.71)	3.00 (.00)
Multimedia (WWW)	5	3.40 (.55)	3.20 (.84)	5	2.80 (.84)	2.80 (.84)	5	3.00 (.82)[b]	3.25 (.96)
Print tutorial	14	3.21 (.80)	3.31 (.75)[c]	5	3.60 (.55)	4.00 (.00)	10	3.20 (.63)	3.40 (.97)
Refer to helpdesk	11	3.45 (.52)	3.40 (.53)[d]	2	3.00 (.00)	4.00 (.00)[e]	2	4.00 (.00)	3.00 (1.41)
Technology course	2	3.50 (.71)	3.50 (.71)	2	4.00 (.00)	4.00 (.00)	1	3.00[f]	4.00[f]

[a] based on three subjects only.

[b] based on four subjects only.

[c] based on 13 subjects only.

[d] based on ten subjects only.

[e] based on one subject only.

[f] as n=1, values for satisfaction and importance are actual rather than mean, and standard deviation is not reported.

important to helping learning happen: a technology course prerequisite (n = 2), referral to AU helpdesk (n = 1), and print tutorials (n = 5).

Very experienced faculty are most satisfied with referral to the AU helpdesk, and least with both a technology course as a prerequisite and multimedia on the Internet. There is a response from one subject in this group rating use of a technology course as a prerequisite as very important to helping learning happen, while overall, print tutorials are next in importance. This group of "very experienced" faculty perceive referral to the AU helpdesk and face-to face orientation as least important.

This preceding analysis of subjects' attitudes toward learner-interface interaction indicates that this type of interaction is highly valued, as indicated by the overall mean ratings for satisfaction (*M* 3.40, *SD* .23) and importance (*M* 3.37, *SD* .29). In addition, ratings for both satisfaction and importance are nearly identical and variance is low. How are these attitudes demonstrated in practice?

Actions Regarding Learner-Interface Interaction

Only 29 subjects provided responses for learner-interface interaction, and the total number of all their responses (for all approaches to this type of interaction) was 77. This is nearly 18% of all the reported approaches for all four types of interaction. In addition to the five choices provided on the survey form, faculty provided seven "other" approaches. The total number of responses of "other" approaches accounted for 8 of the 77 reports of approaches to learner-interface interaction.

Just as with attitudes, it is useful to consider some descriptive statistics regarding how frequently faculty use various approaches to learner-interface interaction. Table 23 illustrates

the number of responses, means and standard deviations for how frequently subjects use the various approaches to learner-interface interaction.

Table 23.

Descriptive Statistics: How Frequently Learner-Interface Interaction Approaches are Used

Approach	# of responses	*M*	*SD*
Face-to-face orientation	5	1.20	.45
Multimedia (WWW)	14	2.70	1.05
Print tutorials	29	3.72	.59
Refer to AU helpdesk	16	2.25	1.13
Technology course prereq.	5	3.20	1.30

The most commonly used approach for learner-interface interaction is print tutorials (n = 29) and this is overall the most frequently used as well. The least frequently used approach is face-to-face orientation.

Frequency of use and delivery mode/experience. Table 24 illustrates the frequency with which subjects use approaches to learner-interface interaction, organised by delivery mode and level of experience.

Not surprisingly, faculty in this study who teach via print also report using print tutorials most frequently as an approach for learner-interface interaction, a result based on reports from 22 subjects. Two faculty report using a technology course prerequisite quite frequently as well.

Table 24.

How Frequently Learner-Interface Interaction Approaches are Used: by Delivery Mode and

Experience

| | Main delivery mode | | | | | | | | |
| | Print delivery | | | Online delivery | | | Mixed mode delivery | | |
Approach	N	M	SD	N	M	SD	N	M	SD
Face-to-face	3	1.33	.58	0	--	--	2	1.00	.00
Multimedia (WWW)	6	2.00	.89	4	3.50	1.00	4	3.25	.50
Print tutorials	22	3.73	.63	2	3.00	.00	5	4.00	.00
Refer to helpdesk	9	2.00	1.11	2	3.50	.71	5	2.20	1.10
Technology course	2	3.50	.71	2	4.00	.00	1	1.00[a]	--

| | Level of experience (in years) | | | | | | | | |
| | New (less than 5) | | | Experienced (5 to 10) | | | Very experienced (over 10) | | |
Approach	N	M	SD	N	M	SD	N	M	SD
Face-to-face	3	1.33	.58	0	--	--	2	1.00	.00
Multimedia (WWW)	5	3.00	1.22	5	2.40	1.14	4	3.00	.82
Print tutorials	14	3.64	.63	5	3.80	.45	10	3.80	.63
Refer to helpdesk	11	2.72	1.19	2	2.00	.00	3	2.33	1.53
Technology course	2	1.50	1.12	2	4.00	.00	1	3.00[a]	--

[a] as n=1, value for frequency is actual rather than mean, and standard deviation is not reported.

The approach used least frequently for learner-interface interaction by faculty who deliver via print is face-to-face orientation, though this result is based on a small number (n = 3). Less frequent use was also reported for referral to the AU helpdesk (by nine subjects) and multimedia on the Internet.

Online teachers use all approaches (except face-to-face orientation, which received no responses) quite frequently. Requiring a technology course as a prerequisite is the approach they use most frequently, with referral to the AU helpdesk and multimedia on the Internet next. Even print tutorials, the approach used by fewest of these subjects (n = 2), are used frequently (*M* 3.00).

Faculty who teach via mixed mode use print tutorials most frequently, with technology course as a prerequisite and face-to-face orientation used least often.

Subjects classified as new faculty use print tutorials most frequently, and face-to-face orientation least. Experienced faculty (5 to 10 years) use a technology course as a prerequisite most frequently and referral to the AU helpdesk least often. Very experienced faculty use print tutorials most frequently and face-to-face interaction least often.

Correlations in Learner-Interface Interaction

This study set out to determine whether there were any correlations between how frequently faculty use approaches to learner-interface interaction, and either their satisfaction with use of the approaches and/or how important they feel the approach is to helping learning happen. We might expect to find the two factors associated with attitude (satisfaction with use and perceived importance to helping learning happen) to be correlated. Within the set of information related to learner-interface interaction, there are a variety of correlations. The following data reports results of Pearson's correlation, with a significance level of .05. Results for correlations which were not statistically significant (where $p > .05$) can be found in Appendix F.

In the case of multimedia on the Internet, there is a positive correlation between satisfaction and perceived importance ($r = .881, p < .001$). Frequency of use is positively

correlated with both satisfaction (r = .723, p = .003) and perceived importance (r =. 637, p = .014).

For print tutorials, there is a positive correlation between satisfaction with use and perceived importance (r =. 784, p <. 001). In addition, there is a positive correlation between frequency of use and perceived importance (r = .419, p =. 026).

In the case of making a technology course a prerequisite, there is a positive correlation between frequency of use and perceived importance to helping learning happen (r = .943, p = .016). There are negative correlations between both frequency of use and satisfaction, as well as satisfaction and perceived importance. However, these correlations are not statistically significant.

Subjects in this study value learner-interface interaction highly. Print tutorials are used by nearly 70% of subjects, and referral to the AU helpdesk by nearly two thirds. However, the level of activity for this type of interaction (based on the total of 77 responses for all approaches) is much lower than for learner-instructor interaction (with a total of 170 responses for all approaches). This suggests that while learner-interface interaction may be valued, it is not attended to as much in practice as are the two types of interaction already reported here (learner-instructor and learner-content interaction). Finally, there are few significant correlations to report. For multimedia on the Internet, frequency of use is positively correlated with satisfaction. Frequency of use of both print tutorials and a technology course prerequisite are also positively correlated with perceived importance of these approaches.

<u>Learner-Learner Interaction</u>

For this study, learner-learner interaction is defined as "inter-learner interaction, between one learner and other learners, alone or in groups, with or without the…presence of an instructor" (Moore, 1989, p. 4). In the survey form, a paraphrased version of this operational definition was provided. Respondents were asked to consider learner-learner interaction as taking place between one learner and other learners, alone or in groups, with or without the instructor's presence.

<u>Approaches to Learner-Learner Interaction</u>

Faculty were provided five possible approaches for learner-learner interaction (e-mail, online bulletin boards, telephone, group projects such as case studies and group assignments, and asynchronous computer conference). There was also space for respondents to add up to two "other" approaches. Faculty suggested a total of five "other" approaches for learner-learner interaction in addition to the list provided in the survey. These other approaches, with the number of responses in parentheses, include: (a) virtual helpdesk (n = 1); (b) in-person labs (n = 2); (c) online chat (n = 1); (d) release forms (n = 1); and (e) teleconferenced study circles (n = 1). The frequency distribution of the approaches for learner-instructor interaction is depicted in Table 25.

Apparently, e-mail is the approach most commonly used for learner-learner interaction, though this result is based on responses from just 15 subjects (less that 40% of the total number of subjects in this study). With a total of 57 responses for all approaches, it appears that learner-learner interaction receives less attention, or generates less activity, than any other type of interaction studied.

Table 25.

Frequency Distribution of Approaches to Learner-Learner Interaction

Approach	# of responses	Percent	Cumulative percent
Computer conference (asynch)	12	21	21
E-mail	15	26	47
Group projects	5	9	56
Online bulletin boards	10	18	74
Telephone	9	16	90
Other	6	10	100
Total	57	100	100

Attitudes Toward Learner-Learner Interaction

In addition to knowing what approaches faculty use, it is also important to know subjects' attitudes (reported levels of satisfaction and perceived importance) toward learner-learner interaction. In order to determine attitudes, faculty were asked how satisfied they were with their use of an approach, as well as how important they felt each approach was to helping learning happen.

Satisfaction. About 70% of faculty who report using asynchronous computer conference and online bulletin boards are very or somewhat satisfied with their use of these approaches. Table 26 illustrates the frequency distribution and descriptive statistics regarding subjects' satisfaction with approaches to learner-learner interaction.

Comparing means, it appears that subjects in this study are most satisfied with using asynchronous computer conference as an approach for learner-learner interaction. Online bulletin boards are also highly rated for satisfaction. Overall, group projects are rated as least

satisfying. However, this is based on a small number of responses, and there is considerable

variance in this result as well.

Table 26.

Satisfaction with Learner-Learner Interaction: Percent and Descriptive Statistics

Approach	Responses (N)	Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	M (SD)
Computer conf.	12	33%	42%	17%	8%	3.00 (.95)
E-mail[a]	13	15%	31%	39%	15%	2.46 (.97)
Group projects	5	20%	20%	20%	40%	2.20 (1.30)
Online bulletin bds	10	30%	40%	20%	10%	2.90 (.99)
Telephone	9	22%	33%	33%	12%	2.67 (1.00)

[a] two subjects who use e-mail did not report a level of satisfaction.

Importance. As with the ratings for satisfaction, approaches to learner-learner

interaction are not rated as highly for importance as are the approaches for other types of

interaction studied. It appears that between 30% and 40% of faculty perceive the approaches

they use for learner-learner interaction to be of little importance or not important. How

important do faculty believe these approaches to learner-learner interaction are to helping

learning happen? Table 27 illustrates the frequency distribution and descriptive statistics

regarding subjects' responses regarding the importance of approaches to learner-learner

interaction.

Comparing means, it appears that both group projects and online bulletin boards are

considered to be important in helping learning happen, with slightly fewer responses for the

Table 27.

Importance of Learner-Learner Interaction: Percent and Descriptive Statistics

Approach	Responses (N)	Very important	Somewhat important	Of little importance	Not important	M (SD)
Computer conf.	12	25%	33%	33%	7%	2.75 (.97)
E-mail	15	13%	40%	33%	14%	2.53 (.92)
Group projects	5	40%	20%	20%	20%	2.80 (1.30)
Online bulletin bds	10	20%	50%	20%	10%	2.80 (.92)
Telephone	9	33%	22%	22%	23%	2.67 (1.22)

telephone as important. Faculty report e-mail to be least important. However, the range of ratings regarding the importance of the five approaches is narrow.

Calculating an overall rating for satisfaction (*M* 2.64, *SD* .33) and importance (*M* 2.71, *SD* .11) suggests that that learner-learner interaction is valued by faculty, though much less than any of learner-instructor, learner-content or learner-interface interaction. Undergraduate faculty at AU are only somewhat satisfied with the approaches they use to provide for and facilitate learner-learner interaction and they perceive these approaches to be only somewhat important to helping learning happen. Subjects provided a total of just 57 responses for approaches used for learner-learner interaction. This total is just 13% of the total number of all responses for all forms of interaction, making learner-learner interaction the type of interaction that is attended to least in practice. In addition to the five approaches provided in the survey form, respondents provided five additional "other" approaches. Of the total 57 reports, six individual reports were of "other" approaches.

Delivery mode and attitudes. What effect does delivery mode have on this picture of subjects' attitudes toward learner-learner interaction? Table 28 illustrates subjects' attitudes regarding approaches to learner-interface interaction, organised by main delivery mode.

Comparing means, those faculty who use print for delivery are most satisfied with their use of asynchronous computer conferences. They are least satisfied with group projects. However, these faculty who teach via print perceive both asynchronous computer conferences and group projects as most important to helping learning happen (though note the variance for importance of group projects). The difference in means between these two approaches rated as most important and the two approaches rated as least important (e-mail and online bulletin boards) is small.

Faculty who teach online are most satisfied with group projects, not including the response of 4.0 by one subject for the telephone. These faculty are least satisfied with e-mail as an approach to learner-learner interaction. But for the lone rating of 4.0 for telephone, the approach faculty perceive as most important is group projects. Faculty who teach online rate asynchronous computer conferences as least important.

Faculty who mix print and online delivery are most satisfied with asynchronous computer conference, though there is considerable variance in this mean. Group projects received just one response from a mixed mode subject, that of 1.0 (very dissatisfied). Other than this single response, faculty in the mixed mode group are least satisfied with e-mail and telephone. These faculty perceive online bulletin boards as the approach to learner-learner interaction most important to helping learning happen. However, with such a wide variance, it is perhaps useful to look at the next highest mean rating, that of asynchronous computer

Table 28.

Attitudes Regarding Learner-Learner Interaction: by Main Delivery Mode

Approach	Print delivery			Online delivery			Mixed mode delivery		
	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)	N	Satisfaction M (SD)	Importance M (SD)
Computer conf.	3	3.33 (.58)	3.00 (1.00)	5	3.00 (1.00)	2.80 (.84)	4	2.75 (1.26)	2.50 (1.29)
E-mail	8	2.50 (.93)	2.50 (.93)	4	2.67 (1.15)[a]	3.00 (.82)	3	2.00 (1.41)[b]	2.00 (1.00)
Group projects	2	1.50 (.71)	3.00 (1.41)	2	3.50 (.71)	3.50 (.71)	1	1.00[c]	1.00[c]
Online bulletin bds	2	2.50 (.71)	2.50 (.71)	5	3.20 (.84)	3.00 (.71)	3	2.67 (1.53)	2.67 (1.53)
Telephone	5	2.80 (.84)	2.80 (1.30)	1	4.00 (.00)	--[d]	3	2.00 (1.00)	2.00 (.00)

[a] based on three subjects.

[b] based on two subjects.

[c] as n=1, values for satisfaction and importance are actual, rather than mean, and standard deviation is not reported.

[d] subject did not indicate a rating for importance.

conferences. Aside from a lone report of group projects as "very unimportant", e-mail and telephone are both rated lowest.

Experience and attitudes. Table 29 illustrates subjects' attitudes regarding approaches to learner-interface interaction, organised by level of experience.

Comparing means according to number of years experience a subject has at AU, it is interesting to note the considerable standard deviation in the means from new faculty, for their responses regarding satisfaction with all five approaches to learner-learner interaction. These "new faculty" rate asynchronous computer conference, e-mail, and telephone as the approaches to learner-learner interaction they are most satisfied with. They are least satisfied with group projects. While the range of mean ratings for perceived importance is not wide, the standard deviation for each mean is considerable. The approach perceived as most important by new faculty is group projects. Means for the remaining four approaches are similar and only slightly smaller.

Except for one response of 4.0 for online bulletin boards as most satisfying among the group of experienced staff in this study, group projects and asynchronous computer conferences are the approaches these subjects are most satisfied with. These faculty are least satisfied with e-mail. Experienced staff perceive telephone as the most important approach to learner-learner interaction, in terms of helping learning happen, with e-mail rated as least important.

The faculty classified as very experienced are clearly most satisfied with asynchronous computer conference as an approach to learner-learner interaction. They are least satisfied with e-mail. In fact, means for satisfaction with approaches to learner-learner interaction by very experienced staff are lower than for any other group. In addition, very

Table 29.

Attitudes Regarding Learner-Learner Interaction: by Level of Experience

| | New faculty | | | Experienced faculty | | | Very experienced faculty | | |
| | | Satisfaction | Importance | | Satisfaction | Importance | | Satisfaction | Importance |
Approach	N	M (SD)	M (SD)	N	M (SD)	M (SD)	N	M (SD)	M (SD)
Computer conf.	5	3.00 (1.41)	2.80 (1.30)	2	3.00 (1.41)	3.00 (1.41)	5	3.00 (.00)	2.60 (.55)
E-mail	7	3.00 (1.10)[a]	2.86 (1.07)	3	2.33 (.58)	2.33 (.58)	5	1.75 (.50)[b]	2.20 (.84)
Group projects	3	2.00 (1.73)	3.00 (1.73)	1	3.00[c]	3.00[c]	1	2.00[c]	2.00[c]
Online bulletin bds	6	2.83 (1.17)	2.83 (1.17)	1	4.00[c]	3.00[c]	3	2.67 (.58)	2.67 (.58)
Telephone	5	3.00 (1.22)	2.80 (1.30)	2	2.50 (.71)	3.50 (.71)	2	2.00 (.00)	1.50 (.71)

[a] based on six subjects only.

[b] based on four subjects only.

[c] as n=1, values for satisfaction and importance are actual rather than mean, and standard deviation is not reported.

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experienced staff do not rate the approaches to learner-learner interaction as highly in terms of importance to helping learning happen. The most important approach to this group is online bulletin boards. The approach rated as least important is telephone.

Increasingly, new technologies offer the potential for distance educators to design increased learner-learner interaction into their courses (Moore & Kearsley, 1996) whether within a formal class or cohort structure, or more informally through study groups and online discussion with participants located anywhere across the globe. Graham and Scarborough (1999) describe another benefit of learner-learner interaction by citing remarks by Cohen (1984) that "research also shows peer interaction assists learners in understanding new concepts and provides an opportunity to commit these concepts to memory" (Cohen, 1984; as cited by Graham & Scarborough, 1999). In addition, learners in a mathematics course studied by Foley and Schuck (1998) described group collaboration as the most satisfying aspect of the course.

Despite these benefits, the subjects in this study do not appear to value learner-learner interaction as highly as they do the other three types of interaction. Perhaps this difference is due to the fact that undergraduate students at AU generally work at their own pace, and without a cohort of classmates. This is the case with self-paced courses, whether delivered via print, online or mixed mode. It is difficult to integrate learner-learner interaction into a self-paced course with no class cohort structure, and the nature of this challenge may explain the lower value faculty appear to place on learner-learner interaction.

Actions Regarding Learner-Learner Interaction

The preceding analysis of faculty attitudes toward learner-learner interaction indicates that this type of interaction is only moderately valued. Considering the overall rating for

satisfaction (*M* 2.64, *SD* .33) and for perceived importance (*M* 2.71, *SD* .11) indicates that

the subjects' attitudes toward learner-learner interaction are somewhat neutral, as opposed to

the considerable value placed on the other types of interaction, especially learner-instructor.

In addition, the ratings for both satisfaction and importance are nearly identical, and variance

is low. So, despite the approaches subjects choose or use, undergraduate faculty at Athabasca

University are only somewhat satisfied with the approaches they use to provide for and

facilitate learner-learner interaction and perceive these approaches to be only somewhat

important to helping learning happen. How are these attitudes demonstrated in practice?

       The overall level of activity for learner-learner interaction (a total of 57 responses for

all approaches) is lower than any other type of interaction (e.g., compare to 170 total

responses for learner-instructor interaction). More of the faculty in this study who responded

to the questions regarding learner-learner interaction use e-mail for facilitating learner-

learner interaction than any of the other approaches. The fewest number of faculty in this

study use group projects. There is considerable variance in the means for how frequently

each approach for learner-learner interaction is used. Among the faculty who use each

approach, online bulletin boards are used with greatest frequency. Group projects are much

less frequently used.

       Just as with results regarding attitudes, it is useful to consider some descriptive

statistics for how frequently faculty use various approaches to learner-learner interaction.

Table 30 illustrates the means and standard deviations for how frequently the various

approaches to learner-learner interaction are used.

Table 30.

Descriptive Statistics: How Frequently Learner-Learner Interaction Approaches are Used

Approach	# of responses	M	SD
Computer conf. (asynch)	12	2.57	1.30
E-mail	15	2.20	1.08
Group projects	5	1.60	.89
Online bulletin boards	10	3.10	1.10
Telephone	9	2.56	1.42

Among the faculty who use each approach, telephone and asynchronous computer conference are used most frequently and group projects least often. What effect does comparing means according to both mode of delivery and years of experiences have on this picture of how frequently faculty use various approaches to learner-learner interaction?

Frequency of use and delivery mode/experience. Table 31 illustrates the frequency with which subjects use approaches to learner-interface interaction, organised by delivery mode and level of experience.

Those faculty who teach via print report using online bulletin boards most frequently, and telephone nearly as often. These faculty use group projects least often. Except for the response from a single online teacher who uses telephone very frequently as an approach to learner-learner interaction, faculty who teach online use asynchronous computer conferences most frequently, and they use group projects least often.

Table 31.

How Frequently Learner-Learner Interaction Approaches are Used: by Delivery Mode and

Experience

| | Main delivery mode | | | | | | | | |
| | Print delivery | | | Online delivery | | | Mixed mode delivery | | |
Approach	N	*M*	*SD*	N	*M*	*SD*	N	*M*	*SD*
Computer conf.	3	2.00	1.73	5	3.40	.56	4	2.25	1.50
E-mail	8	1.88	.83	4	3.25	.96	3	1.67	1.15
Group projects	2	1.00	.00	2	2.50	.71	1	1.00[a]	--
Online bulletin bds	2	3.00	1.41	5	3.20	.84	3	3.00	1.73
Telephone	5	2.60	1.34	1	4.00[a]	--	3	2.00	1.73

| | Level of experience (in years) | | | | | | | | |
| | New (less than 5) | | | Experienced (5 to 10) | | | Very experienced (over 10) | | |
Approach	N	*M*	*SD*	N	*M*	*SD*	N	*M*	*SD*
Computer conf.	5	.20	1.30	2	2.00	1.41	5	2.40	1.41
E-mail	7	2.43	1.13	3	2.67	1.53	5	1.60	.55
Group projects	3	1.67	1.15	1	2.00[a]	--	1	1.00[a]	--
Online bulletin bds	6	3.00	1.27	1	4.00[a]	--	3	3.00	1.00
Telephone	5	2.40	1.52	2	4.00	.00	2	1.50	1.42

[a] as n=1, no standard deviation is reported, and values for frequency are actual, rather than mean.

Faculty who teach via mixed mode use online bulletin boards most frequently. With these faculty, there is only one report of group projects being used, and that is a report of "seldom" (1.0). Except for this single response for group projects, e-mail is the approach used least often by faculty who teach via mixed mode.

Subjects classified as "new" faculty report using asynchronous computer conference most frequently and group projects least often. Subjects classified as "experienced" faculty (5 to 10 years experience teaching at AU) use online bulletin boards and telephone most frequently. These faculty use asynchronous computer conference and group projects least often.

Of the approaches they use to provide for and facilitate learner-learner interaction, very experienced faculty use online bulletin boards most frequently. One of these subjects reports using group projects "seldom" (1.0). Except for this one case, telephone is the approach used least by the group of very experienced faculty.

Correlations in Learner-Learner Interaction

This study set out to determine whether there are any correlations between how frequently faculty use an approach, and their satisfaction with the approach and/or perceived importance of the approach in helping learning happen. We might also expect the two factors associated with attitude (satisfaction and perceived importance) to be correlated. Within the set of information related to learner-learner interaction, there are a variety of correlations. The following data reports results of Pearson's correlation, with a significance level of .05. Results for correlations which were not statistically significant (where $p > .05$) can be found in Appendix F.

For asynchronous computer conference, there is a strong positive correlation between satisfaction and perceived importance to helping learning happen ($r = .889$, $p < .001$).

In the case of e-mail, there is a positive correlation between satisfaction and importance ($r = .781$, $p = .002$). Frequency of use is positively correlated with importance ($r = .533$, $p = .041$).

With group projects, there is a strong positive correlation between frequency of use and satisfaction ($r = .943$, $p = .016$).

In the case of online bulletin boards, satisfaction and perceived importance are correlated positively ($r = .827$, $p = .003$). There is a strong positive correlation between frequency of use and satisfaction ($r = .924$, $p < .001$), as well as a weaker positive correlation between frequency of use and perceived importance ($r = .681$, $p = .030$).

For telephone, there is a positive correlation between satisfaction and importance ($r = .816$, $p = .007$). There is also a positive correlation between frequency of use and importance ($r = .693$, $p = .039$)

Learner-learner interaction is valued moderately by the subjects in this study, regardless of their mode of delivery or years of experience. E-mail is the approach used by the greatest number of faculty for learner-learner interaction and group projects by the fewest. With 57 total responses (all approaches, used by all subjects), learner-learner interaction is, of all four types studied, the type of interaction least attended to by subjects in this study. There are positive correlations between frequency of use and either satisfaction or importance for e-mail, group projects, telephone and online bulleting boards. In addition, all of the approaches except group projects exhibit positive correlations between satisfaction with use and perceived importance to helping learning happen.

<u>Summary</u>

This study was designed to determine subjects' attitudes toward four types of interaction in distance education study, discover whether faculty provide for and facilitate these four types of interaction, and if so, how.

Generally, faculty value three of the four types of interaction (learner-instructor, learner-content and learner-interface) highly. Of these three, learner-interface interaction is valued slightly higher than learner-instructor and learner-content, according to compared means for satisfaction and importance. Learner-learner interaction is just moderately valued, according to mean ratings for satisfaction and importance.

Faculty in this study provide for all four types of interaction. Learner-instructor interaction is attended to most, with 170 responses (total of all approaches for all subjects), or an average of four approaches used by each subject. This compares with:

- learner-content interaction -- 132 total responses, average of 3 approaches per subject

- learner-interface interaction -- 77 total responses, average of just less than 2 approaches per subject, and

- learner-learner interaction – 57 total responses, average of less than 1.5 per subject.

The three approaches commonly and frequently used for learner-instructor interaction are e-mail, print study guide and telephone -- face-to-face meetings are uncommon and seldom used. In the case of learner-content interaction, print study guide and student manual are commonly and frequently used, while multimedia in CD-ROM format is uncommon and infrequently used. The most common and frequently used approach for learner-interface interaction is print tutorials/instructions, while face-to-face orientation is uncommon, and even then, seldom used. There is no approach that is clearly common or frequently used for learner-learner interaction. However, it is clear that group projects are uncommon and seldom used.

There are seven positive correlations between frequency of use and satisfaction. Table 32 presents these results.

Table 32.

Correlations between how Frequently an Interaction Approach is Used and Subjects' Satisfaction

Approach	r	p	Type of Interaction
Group projects	.943	.016	learner-learner
Online bulletin boards	.924	<.001	learner-learner
Multimedia (Internet)	.734	.007	learner-content
Multimedia (Internet)	.723	.003	learner-interface
Telephone	.485	.001	learner-instructor
Video recordings	.478	.016	learner-content
Postal mail	.468	.004	learner-instructor
E-mail	.366	.019	learner-instructor

Three of the four strongest of these correlations involve online approaches (bulletin boards for learner-learner interaction, and multimedia on the Internet for both learner-content and learner-interface interactions).

There is a different pattern in the correlations between frequency of use and perceived importance. Table 33 presents the results of tests of correlation for these two variables.

Only one of the ten positive correlations between frequency of use and importance involves an approach to learner-content interaction. The remaining nine are evenly divided between learner-instructor, learner-interface and learner-learner interactions.

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Table 33.

Correlations between how Frequently an Interaction Approach is Used and Perceived Importance

by Subjects

Approach	r	p	Type of Interaction
Technology course prerequisite	.943	.016	learner-interface
Multimedia (Internet)	.780	.003	learner-content
Postal mail	.722	<.001	learner-instructor
Telephone	.693	.039	learner-learner
Online bulletin boards	.681	.030	learner-learner
Telephone	.648	<.001	learner-instructor
Multimedia (Internet)	.637	.014	learner-interface
E-mail	.533	.041	learner-learner
Print study guide	.498	.002	learner-instructor
Print tutorial/instructions	.419	.026	learner-interface
E-mail	.406	.008	learner-instructor

There are 14 significant and positive correlations between satisfaction with use of an approach to interaction and importance of the approach. Since these correlations may be of interest to some readers (even though they were not were not included in the original research questions) the results are contained in Appendix H. There does not appear to be any particular pattern to these correlations, as they are evenly distributed between the four types of interaction. While 9 of these 14 correlations are moderately strong ($r > .750$), there are both strong and weak positive correlations for both online and other approaches.

CHAPTER V

CONCLUSION

This study of the approaches used for four types of interaction in the delivery of undergraduate education at a distance was intended to contribute to a better understanding of how distance educators provide for and facilitate various types of interaction. While distance learners, and the uses of various technologies and tools, have been studied extensively, faculty have not. Most studies of faculty attitudes in distance education have involved comparing faculty attitudes toward conventional and distance education. There has been little attention paid in the literature to faculty attitudes toward interaction in distance education, particularly the attitudes of faculty at a dedicated distance university.

Purpose of Study and Research Questions

The first objective of this study was to determine practitioners' attitudes toward interaction in undergraduate education at a distance. The second objective was to determine how these attitudes and outlooks are demonstrated in practice. The case of practice examined in this study was undergraduate education at Athabasca University, a dedicated distance education university. This study used a survey, conducted through both postal mail and Athabasca University's interdepartmental mail system to collect data. An introductory announcement and follow-up reminder were sent to subjects via e-mail.

In order to achieve its stated purpose, this study examined the following three general research questions:

1. What are the attitudes of Athabasca University faculty toward interaction as a component of distance education practice?

2.   Do Athabasca University faculty provide for interaction in their practice, and if so,

what tools, processes and activities (approaches) do they employ in order to provide

for and facilitate different types of interaction as they deliver undergraduate education

at a distance?

3.   Are there associations between how frequently approaches are used, how satisfied

faculty are with their use of these approaches and how important faculty believe the

approaches are to student learning?

<div align="center">Discussion of Results</div>

A summary of the results from this study are presented and discussed here, organised

by the three main research questions. A complete presentation of results is available in

Chapter IV.

<u>Attitudes and Actions (Research Questions 1 and 2)</u>

Generally, faculty in this study value three of the four types of interaction highly,

including learner-instructor, learner-content and learner-interface interactions. Learner-

interface interaction is rated slightly higher than the other two. However, learner-learner

interaction is valued just moderately. These results were obtained by comparing the overall

means for subjects' satisfaction with and perceived importance of the various approaches

used to provide for and facilitate each type of interaction.

Faculty provide for all four types of interaction in their practice. However, of the four

types of interaction studied, learner-instructor interaction receives the most attention. In

responding to the question about learner-instructor interaction, subjects supplied a total of

170 responses. When this number is divided by the total number of subjects, the result is an

average of four approaches to learner-instructor interaction being used by each subject. This

<div align="center">113</div>

compares with results for learner-content interaction, with a total of 132 responses, or an average of 3 approaches per subject, and learner-interface interaction, with a total of 77 responses or an average of just fewer than 2 approaches per subject. Learner-learner interaction receives the least attention, with a total of 57 responses, for an average of just fewer than 1.5 approaches per subject.

Courses for undergraduate students at Athabasca University are "offered by continuous enrollment, self-paced, individualised delivery" (Davis, 2001, p. 2). This means that undergraduate faculty at AU must develop and deliver courses that can function without a class or cohort group as a structure for organizing and/or facilitating learner-learner interaction. In discussing the types of interaction in distance education, Moore (1989) predicted that learner-learner interaction would be a "challenge to our thinking and practice in the 1990s" (p. 4). It appears that this challenge applies to the Athabasca University context as well. It may be that the increasing development and implementation of online enhancements in AU's undergraduate courses will address the challenge of providing for and facilitating learner-learner interaction in delivery of undergraduate education at a distance. A similar follow-up study at a future date might be useful if this is an area of interest at Athabasca University.

Frequency of Use, Satisfaction and Importance Correlations (Research Question 3)

Of the seven correlations between frequency of use and satisfaction, three of the four strongest are positive correlations involving online approaches -- multimedia on the Internet for both learner-content and learner-interface interactions, as well as online bulletin boards for learner-learner interaction. This suggests that, particularly with some online approaches, the more frequently an approach is used, the more a faculty member will be satisfied with its

use. It may be that subjects' skills with using online approaches have been developed more recently than their skills with more traditional approaches. If so, then their satisfaction with this skill development would be more recent as well, and more readily recalled.

Patterns in the ten correlations between frequency of use and perceived importance of an approach to helping learning happen are more difficult to discern. Overall, there are fewer "very strong" correlations than the correlations between frequency of use and satisfaction, as $r > .720$ for only three of the ten correlations. Only one correlation involves an approach to learner-content interaction, with the remaining nine evenly divided between learner-instructor, learner-interface and learner-learner interactions. Online approaches are no more prominent than other approaches. It is difficult to come to clear conclusions regarding correlations between how frequently faculty use an approach and their perceptions of how important the approach is to helping learning happen.

When correlations between frequency of use of an approach and both satisfaction and perceived importance are combined (for a total of 17 correlations), an interesting pattern emerges. Of these 17 correlations, 7 involve online approaches. All but one of these seven are moderately strong correlations ($r > .635$). Only five of the ten remaining approaches demonstrate this degree of strength in correlation. These results suggest that, particularly in the case of integrating online approaches, more frequent use may lead to both increased satisfaction as well as perceptions of the approach as important to learning. While this result may be simply a function of online approaches being newer, and so more novel, it may also have implications for the development and implementation of online approaches to interactions in distance education.

<u>Principles of Practice</u>

In order to broaden the scope of this study beyond the particular context of Athabasca University, two documents dealing with principles of practice have been chosen for comparison to the description of interaction in practice presented here. The first is the seven principles of good practice in undergraduate education (Chickering & Gamson, 1991) in tandem with the further development on the seven principles by Chickering and Ehrmann (1996). The second is the set of benchmarks for Internet-based distance education prepared by The Institute for Higher Education Policy (2000).

Of the seven principles of good practice in undergraduate education developed by Chickering and Gamson (1991), five can be connected to or aligned with three of the four types of interaction considered in this study. Chickering and Gamson's principle 1 (encourages student-faculty contact) clearly represents learner-instructor interaction, and principle 4 (gives prompt feedback) describes a function of learner-instructor interaction. Their principle 2 (encourages cooperation among students) represents learner-learner interaction. Study guides and student manuals for Athabasca University courses commonly include learning objectives, which serve to both guide and engage students in the learning process, as well as advice to students about the time they should expect to spend on various course-related activities. For this reason, Chickering and Gamson's principle 3 (encourages active learning) and principle 5 (emphasizes time on task) describe functions of learner-content interaction.

While the seven principles were originally developed for the field of higher education, they have been applied extensively in a variety of educational contexts (Chickering & Ehrmann, 1996) and may be considered as validated by educators. The

primary focus of the seven principles is on teaching and learning processes, rather than institutional systems. Davis (2001) in his case study of Athabasca University's conversion of programs from print-based to online delivery, cites the work of Chickering and Ehrmann (1996) in relating the seven principles to technology-mediated education. Davis notes that "the factors that are important to the effectiveness of online systems are the same for any teaching learning system" (p. 11). As such, both Chickering and Gamson's (1991) work and Chickering and Ehrmann's (1996) development of the seven principles may serve a useful purpose for AU. The fact that five of the seven principles clearly relate to the sorts of interaction that take place at AU means that these seven principles may help guide further study into practice at AU and at other distance universities. Lockhart, et al. (2000) have developed a cross-disciplinary planning and assessment instrument for distance education, based on Chickering and Gamson's (1991) seven principles of good practice. Perhaps the piloting of an instrument similar to that developed by Lockhart et al. at AU would help faculty and their academic centres provide more approaches as options for faculty. This suggestion might be especially useful for both learner-learner and learner-interface interaction which this study indicates do not have an extensive number of approaches in use by faculty.

In 2000, The Institute for Higher Education Policy published a set of benchmarks for *Success in Internet-based Distance Education*. This study took a number of existing sets of principles, based on a review of various distance education literature, to six higher education institutions in the United States for validation and assessment. The study gathered information from faculty and staff regarding the presence of each benchmark in their institution, and determined the perceived importance of each benchmark. Of the 45

benchmarks studied, there are 8 that clearly align with the four types of interaction upon which this study is based (Appendix G).

The Institute for Higher Education Policy (2000) study looked at both attitudes ("how important is the benchmark to ensure quality?") and behaviour ("to what extent is the benchmark present in the program?"). In addition, their report includes descriptive statistical data on both these topics. These benchmarks do not represent solid empirical research for validating the findings of this study, as much as an opportunity to compare results and speculate on findings. Comparing means for the selected benchmarks in Appendix G suggests that, as in this study, the Institute for Higher Education Policy project found learner-learner interaction to be rated lower on both attitude and action scales that the other three types of interaction. What is most interesting to this researcher is the possibility that learner-learner interaction may be valued less (attitudes) and attended to less (actions) by more than just the faculty in this study. Lockhart et al. (2000), in their study of faculty practices in delivering undergraduate education at a distance also found learner-learner interaction was not supported as much as the other types of interaction. It appears that faculty's role in providing opportunities for and facilitating learner-learner interaction in distance education is an area that warrants further study.

<u>Recommendations</u>

This study concludes with seven recommendations for further study. Some of these recommendations are general, while others are more specific.

First, Davis (2001) mentions AU's intention to continue integrating online enhancements and options to its undergraduate offerings. If learner-learner interaction is indeed emerging as the type of interaction that online approaches will be able to more easily

support, there needs to be further study of ways to provide for and facilitate this type of interaction at AU. However, since this type of interaction is only moderately valued by faculty (at AU and elsewhere, it appears), it will be necessary to conduct more in-depth study of learner-learner interaction at AU, into both faculty attitudes and practice. This study did not produce a clear picture of the tools and approaches faculty use for learner-learner interaction, in part because the number of responses was limited, and there was considerable variance in means. This suggests the need for further investigation with faculty and perhaps tutors to determine what approaches they use, what they believe is most important, what they are most satisfied with, and so forth. In addition, it is important to note that this study did not compare subject areas or academic disciplines to look for differences in faculty attitudes or actions regarding learner-learner interaction. Research into possible differences between academic disciplines regarding learner-learner interaction, and how these may relate to traditions and expectations for such interaction within the disciplines, may be a useful topic for future study.

The second recommendation concerns the results of correlations between how frequently an approach is used, and subjects' satisfaction with its use and perceived importance of the approach. In cases where there is a correlation between frequency of use and satisfaction, this study suggests that faculty satisfaction could be enhanced by providing opportunities for use of the approaches with strong positive correlations, including multimedia on the Internet for learner-content and learner-interface interactions, online bulletin boards, and group projects. In cases where there is a correlation between frequency of use and perceived importance, this study suggests that faculty perceptions of the importance of some approaches to helping learning happen might be enhanced by increased

use of multimedia on the Internet, postal mail, technology course prerequisites, and telephone for learner-learner interaction.

A third recommendation concerns the usefulness of conducting a similar investigation with Athabasca University tutors, focussing on the delivery of undergraduate education at a distance. One advantage to such as study would be a much larger group of potential subjects. It would be interesting to see if similar patterns of attitude and actions emerge.

Fourth, in the case of learner-content interaction, it appears that the print study guide and student manual are commonly and frequently used, while multimedia in CD-ROM format is uncommon and infrequently used. Although the correlation is weak and not significant (and is, granted, based on a small number of subjects), the correlation between frequency of use of multimedia on CD-ROM and perceived importance to helping learning happen is the only negative correlation in this study. Perhaps it is unlikely that, given the power and pervasiveness of the Internet, AU will continue to offer large quantities of multimedia content in CD-ROM format. However, if there are to be major initiatives involving CD-ROM format for multimedia content, the results of this study suggest the need for further study of faculty attitudes toward and acceptance of this approach.

Fifth, learner-interface interaction, the type of interaction most highly valued by faculty in this study, offers another area of further study. All the approaches to learner-interface interaction that faculty in this study reported using are what could be classified as strategies for "training the learners". A study of the presence and importance of tools and processes that help faculty "design the interface" to accommodate and address learner needs might produce some useful complements to existing learner-interface approaches.

The sixth recommendation concerns learner-learner interaction. Increasingly, new technologies offer the potential for distance educators to design increased learner-learner interaction into their courses (Moore & Kearsley, 1996). The results of this study, with learner-learner interaction only moderately valued and with less faculty activity, suggests that a similar study designed to investigate learner-learner interaction, with faculty who teach cohorts of students, might produce some interesting comparative results. It may be that the delivery framework for undergraduate courses at AU (largely continuous enrolment, self-paced, individualized study) is a constraint to high levels of learner-learner interaction. However, even within these constraints, emerging online approaches may enable faculty to design more learner-learner interaction strategies into undergraduate courses. Further study in this area would be useful.

Finally, in order to better understand the relationship between faculty attitudes and action regarding types of interaction in distance education, a similar study of faculty in a dual mode university in a similar state of integration of online delivery methods might be of interest and value. A recent issue of the *International Review of Research in Open and Distance Learning (IRRODL)* presented seven case studies of institutions (including AU) that have converted entire programs of study from print to online delivery. Perhaps a similar study of faculty attitudes and actions regarding interactions in distance education from Deakin University in Australia would be an interesting counterpoint for comparison to this study at Athabasca University.

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APPENDIX A

E-mail to Course Coordinators to Validate Survey Content

Dear ,

My name is Jan Thiessen, and I am a student in AU's Master of DE program. I am studying types of learner interaction in undergraduate distance education.

A major part of my study involves a survey of AU's undergraduate faculty (Professors, including Assistant and Associate). My survey will collect information about how, in delivering education at a distance, faculty provide learners with opportunities for various types of interaction.

I want to ensure that the survey instrument for AU's undergraduate faculty contains choices reflect AU's context. So, I am asking Course Coordinators (informally through e-mail) to suggest the approaches (tools and processes)** commonly used by faculty in their Centre. No names of individuals or Centres will be used in any documents I produce.

     **note - Approaches are defined as specific tools (e.g., communication methods, technologies) and/or processes (e.g., learning activities and strategies) employed or facilitated by faculty and intended to produce a desired effect or result.

The survey will ask AU faculty to identify the approaches they use in 4 types of interaction:

- learner-content interaction
- learner-learner interaction
- learner-instructor interaction
- learner-interface interaction

Each type of interaction is defined below. Please use your e-mail's "reply" function and insert your suggestions for the approaches faculty use after each of the 4 questions that follow.

If you have any questions, or need more information, please feel free to contact me by e-mail (jant@athabascau.ca) or phone (780/675-6727, work; 780/675-5002, home). I certainly appreciate your assistance – thank you in advance.

1. Learner-content interaction -- the "process of intellectually interacting with content that results in changes of the learner's understanding…perspective or the cognitive structures of their mind" (Moore, 1989). What approaches do faculty in your Centre use to provide for learner-content interaction?

2. Learner-learner interaction -- "inter-learner interaction, between one learner and other learners, alone or in groups, with or without the…presence of an instructor" (Moore, 1989). What approaches do faculty in your Centre use to provide for learner-learner interaction?

3. Learner-instructor interaction -- "interaction between the learner and the expert who prepared the subject material or some other expert acting as instructor" (Moore, 1989) for purposes of motivating learners, presenting information, organising application of what is being learned and/or evaluation to determine if learners are making progress). What approaches do faculty in your Centre use to provide for learner-instructor interaction?

4. Learner-interface interaction -- that interaction between the learner and a "technological medium in order to interact with the content, instructor or other learners" (Hillman, Willis & Gunawardena, 1994). What approaches do faculty in your Centre use to provide for learner-interface interaction?

Many thanks,
Jan Thiessen

APPENDIX B

Initial E-mail to Athabasca University Faculty

Dear ,

My name is Jan Thiessen and I am writing to ask for your help in a study of learner interaction. In a few days, you will receive a survey, mailed to all undergraduate faculty at Athabasca University. This survey contains some questions about how you provide for various types of learner interaction in your teaching at a distance.

This survey is part of my final research project as an MDE student here at AU. If you have any questions as you complete this survey, please do not hesitate to contact me.

You can reach me via:

> e-mail - jant@athabascau.ca
> or
> phone - 780/675-6727 (w)
> 780/675-5002 (h)

Sincerely,
Jan Thiessen

PS -- I will be enclosing a small token of appreciation with the survey as a way of saying thanks.

APPENDIX C

Cover Letter for Survey Mailing

Box 2391, Athabasca, AB
T9S 2B9 (Phone: 780/675-6727)

Dear Professor <Lastname>,

My name is Jan Thiessen and I am writing to ask for your help in a study of learner interaction in undergraduate distance education, part of my Master of Distance Education (MDE) program here at Athabasca University. This study will contribute to the body of knowledge about practice in delivering undergraduate education at a distance. A major component of this study is a survey of all undergraduate faculty at AU to determine the specific approaches (tools and processes) used to provide learners with various types of interaction.

As a member of the undergraduate faculty at AU, you have been identified as an experienced distance educator. I am seeking your current, first hand information about how you provide learners with opportunities for interaction. In order to get accurate information about the opportunities learners at AU have for interaction at a distance, I need information from all AU faculty. You have not been selected at random; it is important for me to gather information from all undergraduate faculty. Please help by completing and returning the enclosed survey.

For the purposes of this study, interaction is described as being of four types:

learner-instructor interaction: takes place between a learner and the expert who prepared the subject material or some other expert acting as instructor, for purposes such as motivating learners, presenting information, evaluating learner progress, etc.

learner-content interaction: takes place between a learner and subject matter/content and results in changing the learner's level of knowledge, understanding, perspective, etc.

learner-interface interaction: takes place between a learner and a technological medium, in order for learners to interact with the content, instructor or other learners.

learner-learner interaction: takes place between one learner and other learners, alone or in groups, with or without the instructor's presence.

Codes have been assigned to all surveys to ensure that once your survey is returned, you are not troubled with reminder notices. These codes are held in a secure location; your name will

never be matched to your responses. Names of individuals or Academic Centres will not be identified in any documents, so your responses are completely confidential.

It should take about 8 to 10 minutes to complete the survey enclosed here. If you have any questions about this study or this survey form, please e-mail (jant@athabascau.ca) or phone me (780/675-6727). You can also reach me at home at 780/675-5002.

Finally, please accept my thanks in anticipation of your response. I have also enclosed a small token of my appreciation as a way of saying thanks for your participation.

Sincerely,

Jan Thiessen

APPENDIX D

Survey of Undergraduate Faculty at Athabasca University

If you have difficulties completing any part of this form, please don't hesitate to contact Jan Thiessen before submitting your response. You can reach Jan by phone at 675-6727(w), 675-5002(h), or via e-mail at jant@athabascau.ca.

Part A

The first part of this survey asks for baseline information about your experience as a faculty member at Athabasca University.

1. Please indicate the total number of years you have been a faculty member at Athabasca University, as of August 31, 2000. Include sabbatical leave in your total and express as a decimal (e.g., 1.5 years, 3.75 years, etc.).

    I have been a member of AU's faculty for _____ years.

2. Please indicate the delivery mode you use most often for teaching by placing a checkmark √ in the box next to your choice. If you most often use a delivery mode other than print or online, please specify in the space provided by "other".

    print-based home study   ❏

    online delivery   ❏

    other (please specify)   _____

Part B

The second part of this survey asks you to identify and supply information about the approaches (tools and processes) you use to provide learners with opportunities for various types of interaction. This survey asks about four broad types of interaction.

For each of the four broad types of interaction, you will be asked to identify the approaches you use and to indicate:

°   How frequently you use each approach
    (1 - very frequent 2 – frequent 3 – occasionally 4 – seldom na - unsure)

°   How satisfied you are with each approach you use
    (1 - very satisfied 2 - somewhat satisfied 3 - somewhat dissatisfied 4 - very dissatisfied
    na - unsure)

°   How important you believe each approach is to helping learning happen
    (1 - very important 2 - somewhat important 3 - of little importance 4 - not important
    na - unsure)

1. For the purpose of this study, **learner-instructor interaction** takes place between the learner and you as expert, for purposes of motivating the learner, presenting information, organising application of what is being learned, evaluation of learner progress, etc.

What approaches do you use for **learner-instructor interaction**?

For *each approach you use*, please place a checkmark √ in the box next to the approach and circle **one** response under each of frequency, satisfaction and importance.

For each of these approaches you use…	Place √ here ↓	How frequently do you use this approach? (1: very frequently to 4: seldom)	How satisfied are you with this approach? (1: very satisfied to 4: very dissatisfied)	How important is this approach to helping students learn? (1: very important to 4: not important)
e-mail	❑	1 2 3 4 na	1 2 3 4 na	1 2 3 4 na
telephone	❑	1 2 3 4 na	1 2 3 4 na	1 2 3 4 na
postal mail	❑	1 2 3 4 na	1 2 3 4 na	1 2 3 4 na
printed study guide	❑	1 2 3 4 na	1 2 3 4 na	1 2 3 4 na
face-to-face meetings	❑	1 2 3 4 na	1 2 3 4 na	1 2 3 4 na
other (please specify) _____	❑	1 2 3 4 na	1 2 3 4 na	1 2 3 4 na
other (please specify) _____	❑	1 2 3 4 na	1 2 3 4 na	1 2 3 4 na

2. For the purpose of this study, **learner-content interaction** takes place when a learner interacts intellectually with subject matter/content. This type of interaction results in changes in the learner's knowledge, understanding, perspective, etc.

What approaches do you use for **learner-content interaction**?

For *each approach you use*, please place a checkmark √ in the box next to the approach and circle **one** response under each of frequency, satisfaction and importance.

For each of these approaches you use…	Place √ here ↓	**How frequently** do you use this approach? (1: very frequently to 4: seldom)	**How satisfied** are you with this approach? (1: very satisfied to 4: very dissatisfied)	**How important** is this approach is helping students learn? (1: very important to 4: not important)
printed study guides	❑	1　2　3　4　na	1　2　3　4　na	1　2　3　4　na
printed student manual	❑	1　2　3　4　na	1　2　3　4　na	1　2　3　4　na
video recordings	❑	1　2　3　4　na	1　2　3　4　na	1　2　3　4　na
multimedia on CD-ROM	❑	1　2　3　4　na	1　2　3　4　na	1　2　3　4　na
multimedia on WWW	❑	1　2　3　4　na	1　2　3　4　na	1　2　3　4　na
other (please specify) _____	❑	1　2　3　4　na	1　2　3　4　na	1　2　3　4　na
other (please specify) _____	❑	1　2　3　4　na	1　2　3　4　na	1　2　3　4　na

3. For the purpose of this study, **learner-interface interaction** takes place between a learner and a technological medium in order that the learner can interact with the content, instructor or other learners.

What approaches do you use to facilitate **learner-interface interaction**?

For *each approach you use*, please place a checkmark √ in the box next to the approach and circle **one** response under each of frequency, satisfaction and importance.

For each of these approaches you use…	Place √ here ↓	How frequently do you use this approach? (1: very frequently to 4: seldom)					How satisfied are you with this approach? (1: very satisfied to 4: very dissatisfied)					How important is this approach is helping students learn? (1: very important to 4: not important)				
single day orientation session	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
printed instructions/tutorials	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
referral to AU helpdesk	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
multimedia on WWW	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
technology course requirement/prereq.	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
other (please specify) _____	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
other (please specify) _____	❏	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na

4. For the purpose of this study, **learner-learner interaction** takes place between one learner and other learners, alone or in groups, with or without the instructor's presence.

What approaches do you use to facilitate **learner-learner interaction**?

For *each approach you use*, please place a checkmark √ in the box next to the approach and circle **one** response under each of frequency, satisfaction and importance.

For each of these approaches you use…	Place √ here	**How frequently** do you use this approach? (1: very frequently to 4: seldom)					**How satisfied** are you with this approach? (1: very satisfied to 4: very dissatisfied)					**How important** is this approach is helping students learn? (1: very important to 4: not important)				
e-mail	☐	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
online bulletin boards	☐	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
telephone	☐	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
group projects (case studies, research assignments, etc.)	☐	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
asynchronous computer conference*	☐	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
other (please specify) _____	☐	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na
other (please specify) _____	☐	1	2	3	4	na	1	2	3	4	na	1	2	3	4	na

*asynchronous computer conference – participants use personal computers and modems, connect to a central host computer and engage in a (often facilitated/moderated) discussion by posting questions and comments to a bulletin board type of system. Participants do not have to be online at the same time in order to participate.

Thank you for completing this survey. Please place your completed form into the addressed envelope provided and return it as soon as possible.

If you have any questions or difficulties completing any part of this form, please don't hesitate to contact Jan Thiessen before submitting your response. You can reach Jan via e-mail at jant@athabascau.ca, or by phone at 675-6727 (w), 675-5002 (h).

Thank you so much for your participation in this research study. I appreciate your contribution. If you have any comments you wish to make, please use the space below.

Comments

APPENDIX E

Follow-up E-mail for Non-respondents

Date

Dear ,

Last week a survey concerning learner interaction in education at a distance was mailed to you. All undergraduate faculty at AU have been asked to respond to this survey.

If you have completed this survey and returned it, please accept my sincere thanks. If not, please do so today. Because this survey has been sent to only a small group of expert distance educators, it is extremely important that information about your experience be included in this study.

If by some chance you did not receive the survey, or it got misplaced, please reply to this e-mail right now, or call me at 675-6727 and I will get another one in the mail to you today.

Sincerely,
Jan Thiessen

APPENDIX F

Additional Correlation Results (where $p > .05$)

Additional Correlation Results ($p > .05$): all Variables and Interactions

Approach	Variables	r	p
	Learner-Instructor Interaction		
Face-to-face meetings	frequency and satisfaction with use	.243	.500
	frequency and perceived importance	.486	.154
Print study guide	frequency and satisfaction with use	.054	.760
	Learner-Content Interaction		
Print study guide	frequency and satisfaction with use	.098	.571
	frequency and perceived importance	.195	.254
Print student manual	frequency and satisfaction with use	.107	.541
	frequency and perceived importance	.082	.639
Video recordings	frequency and perceived importance	.299	.147
	Learner-Interface Interaction		
Face-to-face orientation	frequency and satisfaction with use	.408	.495
	frequency and perceived importance	.456	.440
Print tutorials	frequency and satisfaction with use	.190	.324
Referral to AU helpdesk	frequency and satisfaction with use	.016	.955
	frequency and perceived importance	.138	.653
	Learner-Learner Interaction		
Asynch. computer conf.	frequency and satisfaction with use	.366	.242
	frequency and perceived importance	.289	.362
E-mail	frequency and satisfaction with use	.522	.067
Group projects	frequency and perceived importance	.557	.329
Telephone	frequency and satisfaction with use	.410	.274

APPENDIX G

Selected Benchmarks and Survey Results

(as reported by The Institute for Higher Education Policy, 2000)

Benchmark	Mean and Standard Deviation: *present* important		Type of Interaction
Teaching/Learning Process			
14. Student interaction with faculty is facilitated through a variety of ways.	*5.7* 4.6	*1.457* 0.736	Learner-Instructor
15. Student interaction with other students is facilitated through a variety of ways.	*5.4* 4.3	*1.675* 0.872	Learner-Learner
16. Feedback to student assignments and questions is provided in a timely manner.	*5.6* 4.8	*1.273* 0.397	Learner-Instructor
22. Courses are designed to require students to work in groups utilizing problem-solving activities in order to develop topic understanding.	*4.9* 3.7	*1.939* 1.163	Learner-Learner
Course Structure			
24. Students are provided with supplemental course information that outlines course objectives, concepts and ideas.	*6.1* 4.7	*1.125* 0.655	Learner-Content
Student Support			
30. Learning outcomes for each course are summarized in a clearly written, straightforward statement.	*5.4* 4.5	*1.578* 0.578	Learner-Content
31. Students can obtain assistance to help them use electronically accessed data successfully.	*5.2* 4.6	*1.650* 1.700	Learner-Interface
34. Easily accessible technical assistance is available to all students throughout the duration of the course/program.	*5.4* 4.6	*1.743* 0.626	Learner-Interface

APPENDIX H

Correlations Between Satisfaction and Importance

Correlations Between Subjects' Satisfaction with an Approach to Interaction and Perceived

Importance of the Approach

Approach	r	p	Type of Interaction
Asynchronous computer conference	.889	<.001	Learner-Learner
Multimedia (Internet)	.881	<.001	Learner-Interface
Online bulletin boards	.827	.003	Learner-Learner
Telephone	.824	<.001	Learner-Instructor
Telephone	.816	.007	Learner-Learner
Print study guide	.800	<.001	Learner-Content
Print tutorials/instructions	.784	<.001	Learner-Interface
E-mail	.781	.002	Learner-Learner
Multimedia (Internet)	.751	.005	Learner-Content
Print study guide	.676	<.001	Learner-Instructor
Face-to-face meetings	.668	.035	Learner-Instructor
Video recordings	.634	.001	Learner-Content
Postal mail	.624	<.001	Learner-Instructor
Print student manual	.398	.018	Learner-Content