Developing Faculty to Use Videoconferencing to Deliver University Credit Courses Over Cable and Satellite

Diana R. Carl

Abstract: Heinich (1984, 1985) expressed disappointment in the lack of acceptance of technologies into the traditional classroom by teachers. This appears to be a phenomenon across all levels of educational institutions including the university. An important step in this integration is the development of faculty skills in the use of these technologies and the provision of a framework usable in making decisions about the use of specific technologies. This paper documents a paradigm used to develop faculty in the use of one specific technology - videoconferencing.

As higher education invests in and develops newer technologies, faculty face the need to gain skills in the effective use of these technologies for teaching. The ability to use these new tools is not necessarily present nor is it self-evident. One only need to reflect on the process involved in learning to use a pen, a fairly simple technology by today's standards, to realize that a grasp of the alphabet, words, syntax, and context was not obtained overnight. The same can be said of learning to teach using the technologies available today. Heinich (1984, 1985) has lamented the lack of acceptance of instructional technologies by teachers in educational institutions.

Universities have been considered slow in the adoption of new technologies for higher education (Ham, 1983). But Habermas (1973) points out that this slowness is indicative of a deliberate, reflective process used in assessing the technology for their own purposes and for the purposes of the communities served.

> An institution of higher learning which is enlightened with respect to the critique of science, and also politically capable of action, could constitute itself as an advocate to urge that among the alternatives of priority for scientific and technological progress, the decision is not made automatically according to the "natural laws" imposed by the military-industrial viewpoint, but is decided, on the basis of a general discursive formation of will, only after weighing politically the practical consequences. (Habermas, 1973, p. 6)

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The formation of will described by Habermas takes time and deliberation before the decision to endorse a technology is made. Roueche and Snow (1978) and McCombs (1985) state that instructional technologies can hinder the teaching/learning process unless teachers have skills to use them, well. In attempting to integrate technologies into the teaching by faculty, there is a need to provide the opportunity for discourse to assess the technology, and secondly, to develop in faculty knowledge and skills which will enable them to make informed decisions about the character of their presentations using these technologies.

The Videoconferencing System

The combination of a live television signal being sent to a series of locations coupled with the return verbal exchange over telephone lines is known as one-way videoconferencing. That is, the originating site has cameras to transmit the visuals and sound from the site. Other sites can participate separately or collectively using telephones and teleconferencing equipment to communicate orally with the originating site. Mount Saint Vincent University selected videoconferencing for distance education in 1981. The system, known as Distance University Education via Television (DUET), uses a live classroom presentation including on-campus students. The presentation is transmitted to distant students studying at home or in receiving centres at work. Students participate in the class by means of a telephone connected to a teleconferencing bridge enabling them to talk with the professor, students in the originating classroom itself, and students at other locations. DUET students view the course using satellite and cable television services. They complete the same requirements as do on-campus students and work on the same schedules as on-campus classes and activities.

Videoconferencing was selected because it enabled the university to reach a distant student population without investing in a separate course structure or heavily in technology. As the class *piggybacks* on the existing courses scheduled to be offered on campus, videoconferencing is an uncomplicated means to maintain equivalency between the standards for course completion on campus and at a distance.

The administration wanted the university to become mobilized to engage in distance education as easily as it accomplished on-campus teaching. As individual professors are responsible for the teaching which occurs in the classroom, the university wanted this same delineation of responsibility and autonomy to extend to the practice of distance education. Since distance education normally calls for the employment of technologies and methods alien to faculty, faculty needed to be prepared to use these technologies routinely in their distance teaching, to be able to make informed decisions regarding use, and to ultimately use these technologies in individually creative ways in their teaching.

Although there has been much discussion about the suitability of face-to-face courses for distance education, Mount Saint Vincent University used the face-to-face course as the basis for developing the videoconferenced version. Most distance education is developed using a course team approach (Holmberg, 1985), which is problematic for the structure of the university (Carl, 1985). There have been criticisms of the teaching ability of faculty and extension of this to the conclusion that university faculty should not be exposed to distant students. There are, however, indicators that this is an overstatement of the situation. While university faculty generally are unfamiliar with the principles found in course design (Shrock, 1985), my observations indicate at least a rudimentary sensitivity to student which is reflected in the course structures. If the faculty member's course has the approval of the academic department and Senate and has a significant history of being taught and revised, the

course and faculty member are considered candidates for videoconferencing development.

The Goals of Faculty Development in DUET

The major goal of the workshop is the introduction of faculty to videoconferencing as well as further constructive discussion of this technology among the faculty themselves. An analysis of the beliefs and attitudes of the Mount Saint Vincent University faculty population indicated a lack of understanding regarding the distinction between commercial television, educational television, and videoconferencing. In making decisions regarding course development for videoconferencing, I noted that faculty tended to base decisions on a need to reach a mass audience rather than to attain educational outcomes. Finally, the passive medium of television had to be distinguished from the participative medium of videoconferencing. Specific objectives were generated for the workshop:

1) faculty would be able to distinguish between commercial television and educational television, and between videotaped formats and videoconferencing;
2) they would point out several ways in which teaching over a videoconference system is different from, and similar to, face-to-face teaching;
3) they would discuss specific issues related to developing their own courses for DUET, citing examples from the workshop; and
4) they would be able to discuss the effect of learning by means of a videoconference system.

The primary topics of the workshop were derived from a task analysis:

1) the distinct characteristics of videoconferencing;
2) the technical components of videoconferencing;
3) the elements of face-to-face instruction;
4) the distinctions between face-to-face delivery and videoconferencing;
5) techniques for effective instruction in videoconferencing; and
6) techniques for effective class management in videoconferencing.

Educational Videoconferencing Distinguished from Educational Television

As a medium for expression and as a means for the delivery of instruction, television is still regarded with much suspicion in academia - although I see evidence that this is gradually changing. Faculty I have encountered have described television as a passive medium and one used primarily for (mindless) entertainment. One need only look at the products of PBS, TVOntario, or of the Open University to recognize that most of the programmes are passive, noninteractive videotape presentations. These reflect many of the values of commercial television, using techniques to attract and hold a mass audience. Preproduced graphics, semiscripted or fullyscripted formats, elaborate sets and lighting arrangements are readily viewed examples of this influence on educational television. Academics who view commercial and educational television have developed assumptions about how the medium should be used based on their own primary experiences with television as a mass medium and with little attention to educational outcomes and processes. Some studies describing the attributes of various technologies reinforce these assumptions but, as Solomon (1979) points out, treating technologies as "invariant, discrete entities" (p. 7) is to ignore the number of possible ways in which the technology

can interact with learners and content and to limit the perception of what can be accomplished with the technology.

To understand this mind set, one might compare presentations on television to presentations found in books. If one only read technical reports, then one would tend to expect all books to have the same type of format and style. The concept of a different style and format for modern fiction or for Shakespearean literature would be foreign to that reader. In much the same way there has been a tendency in higher education to use formats and styles of commercial television as opposed to selecting style and format based on educational intents (Blake, 1984; Carl, 1984).

As well, faculty often mistakenly identify videoconferencing with the passive medium of television. In videoconferencing the television signal is sent live as it occurs to the learner. Learners can interact with the live presentation via the telephone. The comments of distant learners are intended to influence the presentation and format, which becomes responsive to the learner both visually and through the dialogue which occurs. Thus, it is not so much the intention of educational videoconferencing to attract and hold a passive mass audience as it is to stimulate participation in the learning experience. The format is by definition immediately flexible to the needs of distant students, enabling an immediate change in strategy as distant learner participation indicates a change is in order.

In summary, the distinction between the elements of commercial television and educational television is important to faculty development in videoconferencing in that they be able to recognize the relationship between selection of elements in the program and the desired outcome (i.e., to attract a share of the mass audience or to educate). Secondly, the distinction between videotaped and videoconferenced formats is important so that faculty recognize the potential synergistic relationships which can be accommodated using videoconferencing.

Face-to-Face Distinguished from Distance Instruction

University systems have been structured to support face-to-face instruction (Heinich, 1984). Faculty are most familiar with face-to-face teaching. They have been reluctant to adopt technologies and strategies which separate them from their students and are skeptical about incorporating advanced technologies into teaching. In a study of the use of another advanced technology in education, computer-assisted instruction, Sprecher and Chambers (1980) state that one concern faculty have is that the use of these technologies will hinder the social development of the student and the social process they perceive as important for learning to be internalized. Faculty view themselves as stimulating the social environment of the student so that learning comes not only from the professor and printed resources, but also from thought-provoking interaction with peers.

Unfamiliar technologies themselves threaten faculty (as they do many people). The faculty member who does not know how to use an overhead projector or who fumbles loading a film projector, feels a loss of control over the learning environment and an inability to effectively direct the learning experiences of his or her students. The problem is compounded when the students are not in view of the professor. There is no immediate visual feedback to the professor as to how the students are responding to the instruction or to the technology employed. The instruction and the interaction, then, are altered by the technology through which it is filtered.

Few researchers have treated the issue of combining the distance and face-to-face presentation in a single session. Holmberg (1985) discusses combination, but it is unclear

whether he is referring to sessions in which the instructor is teaching both on-campus and distant students or to the use of distance procedures combined with some oral classes with distant students. Haughey (1983) and Catchpole (1985) describe the delivery of videoconferenced courses exclusively for distant students. In many studies presentations via distance technologies have been compared both favorably and unfavorably with face-to-face presentations.

A review of the literature on educational technology, distance education, and teaching improvement appears to indicate that the face-to-face presentation normally used in universities has been the target of much criticism but has received little definition or analysis. Some (e.g., Harrington, 1977; Sweeney & Reigeluth, 1984) point out that there is evidence supporting the validity of traditional methods, while proponents of distance education and educational technology (e.g., Shaw & Taylor, 1984; Jevons, 1984) argue the opposing point of view. In assessing the arguments of distance educators, it is questionable whether they have really identified the problem in working with university faculty. This may be a case of a solution in search of a problem. Faculty who have taught a course at least once have received feedback from their students and have used this feedback to make changes to the course. Although the course may have not been designed according to respected principles of instructional design, a measure of instructional design has occurred for the on-campus course. It appears questionable, then, to assume that the face-to-face presentation is an unsuitable basis for the development of distance education. The decision to adapt an existing on-campus course to a technology is multi-variate and should not necessarily rely on ways in which the technology has been used in the past.

Faculty, then, require skills and knowledge which will enable them to understand how the technology filters the instruction and the effects it has on interaction if they are to overcome anxieties and are to effectively use the technology. Thus, a second objective of faculty development in videoconferencing is enabling faculty to examine how a videoconference to distant students alters the message (i.e., the course designed for on-campus students), and to effectively control and manage the learning process for both on-campus and distant students.

The Paradigm for Analysis of Teaching for Transfer to a Technology

The literature on distance education distinguishes between dedicated distance education institutions (those which offer courses exclusively to distant students and thus have been specifically designed for distance delivery) and bimodal institutions which offer courses both on campus and at a distance (Jevons, 1984; Holmberg, 1985; Stubbs, Lumsden, & Knapper, 1985). In bimodal institutions, distance sections of a course are normally segregated from on-campus sections and undergo a separate development process for exclusive delivery to distant students. Karpiak (1985), for example, demonstrated this segregation in a survey of distance languagecourses in Canada. DUET is peculiar in that the presentation is at once a face-to-face and distance presentation and must result in effective learning for both a face-to-face group and a distant group. Therefore, the course design has to be structured to yield an effective face-to-face experience while also yielding an effective distance experience filtered through the technology.

Redevelopment of existing courses has been an area of contention in the literature. Heinich (1984, 1985), Shrock (1985), Shaw and Taylor (1984), Romiszowski (1981), Harrington (1977), and Jevons (1984) have expressed frustration at the lack of cooperation by educationists in using course development techniques and educational technologies in

their work. It has been an easier route to develop separate administrative and course structures for using educational technologies and delivering distance education (Carl, 1985). Little discussion appears to have taken place regarding the adaptation of existing administrative and course structures to educational technology. Those who have treated it (Mizell, 1978; Clark & Angert. 1981; Shrock, 1985: Shaw & Taylor, 1984; and Moses, 1985) appear to consider adaptation of courses to be an issue of faculty development and have made few inroads in changing the traditional academic structure.

It is notable that there were few models or case descriptions found in the literature which could serve as a guide for systematic analysis directed to the adaptation of a course to educational technology. Barrow and Meacham (1983) adopted the "science of muddling through" described by Lindblom. Stubbs, Lumsden, and Knapper (1985) have also referred to the use of muddling through at the University of Waterloo. Holloway (1984) describes a model for adaptation in very general terms, appearing to suggest that technologies be adapted to existing situations and structures. He cites grounded theory (theory based in demonstrated events and facts) as a basis for adaptation. In developing new technologies for education, however, relying on a history of observable data may be impossible: a systematic history may not exist for a particular technology. In addition, the grounding of past experiences merits questioning to determine how valid they are for generalization to the present course.

Vedros and Foster (1981) presented a model for trouble-shooting defects in instructional programs which might be considered a basis for adaptation. The model serves as a good general basis for examining a macro-system of education but provides no details for an analysis of the individual interactions among teacher, subject matter, and students that link presentation to intended outcomes. What appears lacking is a model for systematically examining the existing course and prescribing a rational adaptation to distance education and to the technology employed.

In adapting a course to videoconferencing, it is important to retain those elements of the course design which appeared effective for the on-campus mode while changing those which were not effective or which would not be adequately experienced at a distance through the available technologies. There was a need for a structure by which the existing on-campus instruction could be analyzed for videoconference delivery.

The purpose of this analysis is to ensure the existing course has a sound basis from which to work and to later determine the potential effects of these elements as they were massaged by the technology. The structure selected for this purpose was the mathetics model (Gilbert, 1962) which could be used to analyze the elements of the face-to-face instruction and their effects on the student population. Gilbert's work, influenced by Skinner, is the application of a behavioral approach to instruction. Gilbert has influenced the work of other instructional designers (Romiszowski, 1981; Gagne, 1971; Cropper, 1983; Merrill, 1971). While other analytic models have evolved from Gilbert's model, Gilbert (1974) used mathetics as a basis for discrepancy analysis which can be used to determine where problems lie in the performance of a student. Using Gilbert's model, one first describes the ideal performance of a student and then uses the model to determine where the discrepancies lie between the model and actual performance.

Mathetics is defined as "the systematic application of reinforcement theory to the analysis and reconstruction of those complex behavioral repertories usually known as *subject-matter mastery."* (Gilbert, 1962, p. 8). Romiszowski (1981) summarized mathetics as the combination of behavioral chains, discriminations, and generalizations which in

combination form a level of mastery. The simplest unit upon which mathetics builds is as follows:

S—>R. Sc

where S is the stimulus (or presentation to the student), R is the response the student gives to the stimulus, and Sc is the reintbrcer which becomes the stimulus for the next response thus setting the stage for chains, discriminations, and generalizations. This unit is important to this paper in that it is used as the basis for the discrepancy analysis model used in analyzing the existing on-campus instruction prior to preparing it for videoconferencing.

Romiszowski (1981) states that "Gilbert suggests the preparation of a behavioral *prescription, a* map of all the separate behaviours that make up mastery of the task being analyzed" (page 89). This map defines the desired outcome of the instruction and the systematic relationship of all performance elements to that outcome. Using the scheme as an analytic model for existing university instruction, one begins by constructing a model of the ideal performance of a student who would be considered to have successfully completed a course. During the process it is not uncommon that the model of ideal performance is altered. By *backward-chaining,* one can determine the relationship of various sub-behaviours, presentations, and assignments to the ideal performance, mapping the links and gaps in the existing instruction. Using this technique it is easier to discuss the elements of the course with the professor and to determine the weaknesses, which can then be addressed. The analysis tells the instructional designer and professor where the gaps appear but does not provide a guide to remedy the instruction.

The discrepancy analysis (Gilbert, 1974) identifies these shortcomings. Using a discrepancy analysis, it is possible not only to find where the gaps in the instruction occur but to locate where in the performance chain the problem is occurring. Gilbert named three possible *areas of causation* for non-performance:

1) *The environment:* the environment is preventing clear perception of S, interferes with R, or presents a competing Sc which is stronger than the Sc associated with a model performance.

2) *The student's repertory of behaviour:* the student has not learned to perceive the S, lacks the knowledge of how to respond, or has no knowledge of the Sc.

3) *The students themselves:* the students have difficulty perceiving the S, have physical difficulties which prevent R, or do not see the Sc as important.

Figure 1 (see next page) shows the matrix of performance analysis.

In using this model to analyze the existing on-campus instruction, the instructional designer gains a clearer understanding of the intentions of the course and how the elements combine to yield the desired learning. The intentions, presentations, interactions, assignments, and tests are categorized in observable terms which the instructional designer and professor can use in determining whether learning is taking place. In total, through this process the existing course is:

Figure 1.
Performance Analysis.

AGENT	S	R	Sc
Environment	Inputs are not clear	Interference prevents the response	Consequences of behaviour are out of balance
Student's Repertory of Behaviour	Cannot generalize or discriminate the stimuli	Lacks the skill to make the response	Student gets no confirmation of her/his behaviour
Students	Unable to perceive the stimuli	Unable to make the response	Doesn't care

1) analyzed for soundness in its present version;
2) translated into terms which are more discernable to both the instructional designer and the professor;
3) mapped to determine the relationship of the various stimuli, responses, and reinforcers to the overall outcomes and to uncover gaps, ineffective stimuli, irrelevant responses, or ineffective reinforcers; and
4) prepared for adaptation to distance delivery using videoconferencing.

As a side note, it is important to realize that professors allowed this analysis of the on-campus instruction to proceed because the course was to be adapted to distance education. I have noted that when I have tried to use this approach for analyzing problems in courses not destined for DUET, faculty appear reluctant to engage in the process.

The structure of the on-campus course having been dealt with, the next phase of the analysis is concerned with determining the effect the distance technologies have on the existing instruction and to plan so that the same course can be effectively delivered at a distance. As the medium massages the message (McLuhan & Fiore, 1967), the technology massages the elements of the course: the S, R, and Sc. The elements of the presentation (S) are altered by their presentation on the television screen. The discussions, class exercises, and assignments (R) are altered by the presence of a different technology which must be used in making the response. Using the technology to perceive S and to respond will present different consequences (Sc) to the student than those found in the face-to-face situation.

A second layer is added to the discrepancy analysis to examine the effects of the technology on S, R. Sc. The intent of this phase is threefold:

1) to determine the effects of the technology on each element;
2) to arrive at a prescription to ensure the distant student has
   a) adequate perception and understanding of S as it is presented via the technology, and
   b) opportunity for and comfort with R as they make the response via the technology ; and
3) to identify and use valued and recognized reinforcers to using the technology for instruction.

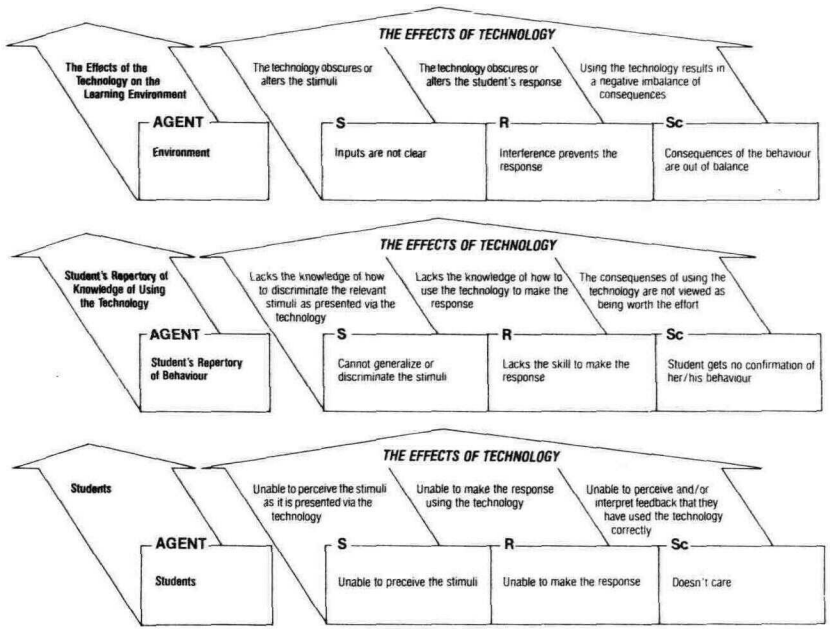
Each cell of the discrepancy analysis is examined to determine the effect of the technology on that cell. For example, in the cells at the first level, environment, the use of the television format could distort or inhibit the perception of some S, such as a diagram drawn on a chalk board. The telephone technology might have distortion on the line which interferes with responding. Noise on the line might result in an imbalance of consequences (Sc) in which it is more rewarding for the student not to respond. At the second level, repertory of behaviour, the student may not know how to perceive S as it is presented through the technology, may not know how to respond (R) using the technology, or is unaware of the consequences (Sc) of responding via the technology. At the third level, the student may be physically unable to perceive S using the technology, is physically unable to respond using the technology, or does not perceive responding as being worth the consequences (Sc). By examining each cell, the estimated and actual effects of the technology can be diagnosed so that a prescription can be written which will promote an optimum experience using distance technologies. Figure 2 (see next page) demonstrates this augmented model of discrepancy analysis.

In addition to the analysis of the face-to-face instructional experience, the dynamics of class management are explored relative to the experience the professor wishes to provide. In each faculty-student contact, there is a style of management, asserted by the faculty, to which the students respond. The situational leadership paradigm of Hersey and Blanchard (1982) is directly transferable to education. The type of style, according to Hersey and Blanchard, should reflect the student's familiarity with the instructional task and the *willingness* of the student to engage in the activity. In practice, the use of situational leadership means that, depending on the student's knowledge of the subject and attitude, the professor should adopt an appropriate way of interacting with that student. Students enrolled in an entry level course may require a more highly directive leadership, while those enrolled in a senior seminar will require more support but less direction. Figure 3 (see next page) represents this relationship.

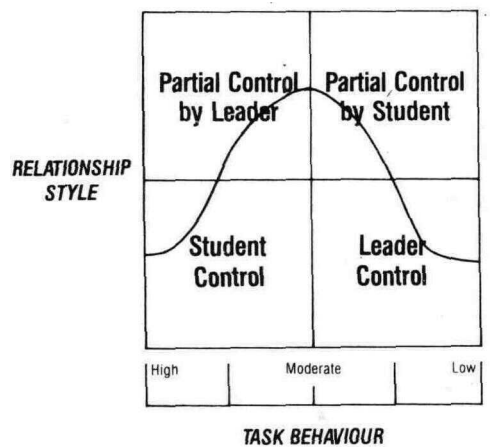
The concept of situational leadership calls into question the concept of the adult as a self-directed learner. Initially in the learning situation, people will require increased direction until they are more assured in their abilities to learn. Fales and Burge (1984) describe, for example, the initial confusion and insecurity of adult students enrolled in a teleconferenced course until they received well-defined instructions. The need for external direction and reassurance diminished as students became *self-directed.* Lam (1985) linked the instructional approach used in both higher education and in community colleges with the cognitive maturity of the student, pointing out that adult learners lacking experience in formal education desire a more structured approach while their more sophisticated cohorts prefer less instructor-dominated experiences. This would seem to indicate a need for the class management style of the professor to match the skill level of the student as opposed to implementing self-directed approaches for all adult learners. The management style would change as the students become more familiar with the subject matter and the task.

As the choice of style relates to familiarity with content, familiarity with the method of learning employed is also a factor in selecting a leadership style. Students who are unfamiliar with given learning strategies or technologies may fail not because of a lack of understanding of the subject, but rather because they do not know how to learn using the strategy or technology employed.

Figure 2.
*Expanded Performance Analysis: The Effects of Technology nn the S-R*Sr Chain.*



Figures.
Situational Leadership Applied to Education.



> Situational Leadership may provide some insights into problems that have developed in the innovative self-pace learning curricula that have sprung up across the country at many educational levels...These programs have been developed in an attempt to individualize instruction and are premised on maximum freedom for the student...The intention now is for the students to initiate structure for themselves. The teacher becomes involved only at thestudent's request. (Hersey and Blanchard, 1982, p. 166)

Although many people know how to use the telephone and television, they have not used these media for learning. In using these technologies for learning, they employ behaviors which work well for socializing or being entertained, but which interfere with the student's ability to learn effectively from using the technology. Therefore, in directing the learning of students new to videoconferencing, professors should be aware that more direction is needed to enable the students to use the technology for learning until such time as the students demonstrate a facility in its use for education and a willingness to participate using the technology.

Faculty development in DUET, then, concentrates on creating an awareness in professors of their class management style and its impact with regard to teaching the subject. Professors are also introduced to the interaction of the technology with the subject so that they recognize the effect of the technology on their students and can provide an appropriate style to ensure an effective learning experience.

In order to provide an effective learning experience using the distance technology, then, the professor needs to be aware of:

1) the level of familiarity the student has with the content; and
2) the level of familiarity the student has with using the technology.

The management style used will vary depending on both these variables. A student, for example, who is quite familiar with the subject area but not familiar with using the videoconference system for learning will need a high degree of supportive behaviour from the professor in learning the subject but will need a high degree of direction in learning to use the technology.

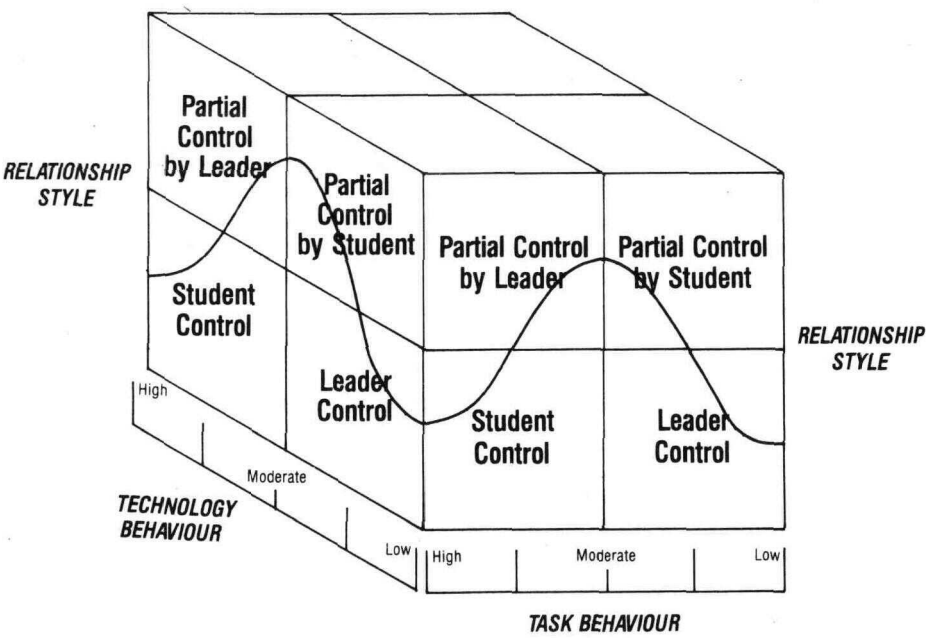
To assess the level of the student for each task, a third dimension is added to the Hersey and Blanchard model to aid in the decision about the appropriate class management style. Figure 4 illustrates this added dimension and the types of management style which might be employed for the two tasks.

The style selected is dependent on two tasks the student is to accomplish: learning the subject matter and learning with the technology. This calls for the professor being aware of these two tasks and exercising one type of style in teaching the subject but possibly a second style to facilitate the learning experience using the technology.

The Strategy in Action

The models are presented to faculty during a hands-on workshop held each semester in the DUET facility of Mount Saint Vincent University. During these workshops opportunity for hands-on experience in presenting a lesson through videoconferencing is provided, as well as the chance to experience the lesson as a distant student would. It has been useful to

Figure 4.
Expanded Situational Leadership Applied to Educational Technologies.



promote open discussion on both the positive and negative observations of videoconferencing as it is presented in the workshop. Botman and Gregor (1984) and Moses (1985) have noted that in higher education encouraging faculty to engage in individual consultations, to reflect on the applications of teaching improvement programmes and to engage in peer discussions regarding issues about the concepts presented, is an important part of such programmes. Faculty have responded positively to unobstructed inquiry into the relative merits of videoconferencing. This, in turn, has been beneficial in promoting examination of pedagogy in the university setting, examining the uses of other technologies in higher education, and in establishing a higher degree of comfort with videoconferencing and inviting further exploration.

For those professors electing to develop entire courses over DUET, the process which began with the workshop takes on more breadth. Strategies for long-term support to distant students throughout the course are developed. These include access to library resources and creating channels through which non-verbal assignments and interactions can be effectively used by distant students to communicate with the professor. For example, in planning the Introductory Accounting course, it was discovered that the standard accounting sheet could not be viewed clearly enough for learning over television screens. Extensive redesign of the visuals for the course was undertaken to ensure that distant students could visually process the accounting procedure from the television screen. It also became evident during the process of analysis that the capability of DUET's videoconferencing facility offered more opportunity for visualization than was possible in the normal classroom. The decision was made to use the video to enlarge the experience of the in-class group as well as that of distant students.

Developmental analyses of courses do not always result in a decision to proceed with a course over DUET. In one course, the need for visual confirmation of the skill level of distant students proved difficult with the one-way videoconference system. The decision was made to delay development of the course for DUET until suitable visual feedback mechanisms could be established. In yet another, we realized that the professor was exhibiting non-verbal behaviors which displayed to his students his uneasiness with the technology and which appeared to make distant and in-class students uncomfortable in their learning experience. In another, it soon became evident that the professor would not recognize nor be sensitive to the needs of her distant students. In all these cases, the decision was made not to proceed with the course.

Ultimately, the goal of faculty development for DUET is that faculty will become comfortable enough with the potentials of videoconferencing to experiment with new methods and develop their facility for on-going planning for the technology. For those professors who have taught on DUET at least once, there is informal evidence that this skill is being honed as might be expected. I have noticed that these faculty have begun taking more initiative in developing other courses for DUET, and have employed the concepts and practices formulated in the earlier sessions. They are beginning to experiment with using videoconferencing in individualistic ways for instructional purposes. Some have begun to shoulder more responsibility for organizing their own supports to distant students.

Development opportunities have been offered for eight semesters to groups both inside and outside Mount Saint Vincent University. Workshops have been consistently filled to capacity. Responses to the workshops have been very positive in both verbal and written responses. Some comments have been as follows:

> (I liked) the interaction among all present. A very comfortable experience. The individuality of each person was appreciated and understood by others ...it was a marvelous experience.
>
> ...looking funny on TV is no longer a problem for me.
>
> (I liked) your openness to suggestions.
>
> I realized that such a wide variety of skills and disciplines could be utilized.
>
> There was a chance to try new things in a non-threatening situation.

The primary drawback of the workshop appears to be the time element. Due to time constraints, the workshop is only one day. Obviously, more long-term attention is needed if faculty are to reach a level of creative productivity in using the videoconference system.

Summary

Ham (1983) has suggested that the university as an institution will mold technology to education rather than education to technology. In determining how technologies are put to use by society, then, the university's involvement in assessing and developing technology becomes important. The outputs of the university are that of its individual faculty. As each one has learned to use the pen effectively in research and in education, the challenge for the faculty of tomorrow is to develop their facility in creating academic communications and to personalize the technology to the individual teacher/student relationship.

Faculty development for DUET has been structured to be a rational approach to enable

the university to become involved in distance education and educational technologies using existing course and administrative structures. The intent is to prepare faculty to use these technologies effectively in planning their own distance courses.

In this paper the role of videoconferencing and its distinguishing characteristics from other related video technologies were demonstrated and discussed . Decision-making for videoconferencing differs from that employed for non-interactive video formats. Likewise, the intents and structure of educational television differ from those of commercial television.

A model for analysis and preparation of an existing on-campus course for videoconferencing was generated from Gilbert's (1974) discrepancy analysis. The model provides for dissection of the course elements so that the soundness of the existing course can be determined. Discrepancies among wanted outcomes, presentations, and assignments can be identified, clarified, and discussed. The effect of the technology on each element is analyzed and a prescription arrived at to plan for an optimum learning experience at a distance.

The effect of class management styles on the learning and on using technologies for learning was discussed. It was suggested that professors be aware of the skill level of students in two areas: degree of familiarity with the subject matter and degree of familiarity with learning using the specified technology. The style of class management employed will depend on the student's level of skill in learning the subject matter and on the level of skill in using the technology for learning.

REFERENCES

Barrow, B., & Meacham, D. (1983, July). Instructional design and academic planning. In J. Taylor, J. Timmins, & V. J. White (Eds.), *Collected Papers of the 6th Biennial Forum of the Australian and South Pacific External Studies Association.* Toowoomba, Australia: Darling Downs Institute Press.

Blake, I. (1984, Summer). The telecourse and the teacher. *Association for Canadian Studies Newsletter, 6* (2), 7-8.

Botman, E. S., & Gregor, A. D. (1984). Faculty participation in teaching improvement programs. *Canadian Journal of Higher Education, 14* (2), 63-73.

Catchpole, M. (1985). An instructor's guide to producing and hosting a live interactive telecourse. *Proceedings of the 13th World Conference of the International Council for Distance Education.* Melbourne, Australia: LaTrobe Micropublishing.

Carl, D. (1984). Using video teleconferencing over open-broadcast satellite to deliver university credit courses. *Proceedings of the 2nd Biennial Canadian Satellite Users Conference.* Ottawa, ON: Telesat.

Carl, D. (1985). The sloppy slogging business of integrating distance education into the traditional university structure. *Proceedings of the 13th World Conference of the International Council for Distance Education.* Melbourne, Australia: LaTrobe Micropublishing.

Clark, F., & Angert, J. F. (1981). Teacher commitment to instructional design. *Educational Technology, 21* (5), 9-15.

Fales, A. W., & Burge, E. J. (1984). Self-direction by design. *Canadian Journal of University Continuing Education, 10* (1), 68-78.

Gagne, R. (1971). The design of optimal conditions of instruction. In M. D. Merrill (Ed.) *Instructional design: Readings,* (pp. 102-118). Englewood Cliffs, NJ: Prentice-Hall.

Gilbert, T. F. (1974). *Levels and structure of performance analysis.* (Praxis Technical Paper No. 1). Morristown, NJ: Praxis.

Gilbert, T. F. (1962). Mathetics: The technology of education. *Journal of Mathetics, 1,* 7-73.

Gropper, G. L. (1983). A metatheory of instruction: A framework for analyzing and evaluating instructional theories and models. In C. M. Reigeluth (Ed.) *Instructional-design theories and models* (pp. 37-73). Hillsdale, NJ: Lawrence Erlbaum.

Habermas, J. (1973). *Theory and practice* (J. Viertel, Trans.). Boston, MA: Beacon.

Ham, J. M. (1983). Technology and the human adventure. *Canadian Journal of Higher Education, 13* (3), 97-103.

Harrington, F. H. (1977). *The future of adult education.* San Francisco, CA: Jossey-Bass.

Haughey, M. (1983, July). Teaching and learning via interactive satellite - a Janus view. In J. Taylor, J. Timmins, & V. J. White (Ed.) , *Collected Papers of the 6th Biennial Forum of the Australian and South Pacific External Studies Association, Vol. 2.* (pp. 443-453). Toowoomba, Australia: Darling Downs Institute Press.

Heinich, R. (1984). The proper study of instructional technology. *Educational Communication and Technology Journal, 32* (2), 67-87.

Heinich, R. (1985). Instructional technology and the structure of education. *Educational Communication and Technology Journal, 33* (1), 9-15.

Hersey, P., & Blanchard, K. (1982). *Management of organizational behaviour* (4th ed.). Englewood Cliffs, NJ: Prentice-Hall.

Holloway, R. E. (1984). *Educational technology: A critical perspective.* Syracuse, NY: ERIC Clearinghouse on Information Resources.

Holmberg, B. (1985). *Status and trends of distance education.* Lund, Sweden: Lector Publishing.

Jevons, F. (1984). Distance education in mixed institutions: Working towards parity. *Distance Education,* 75 (1), 24-37.

Karpiak, R. (1985). Language teaching through distance education at Canadian universities: A status and trends. *Proceedings of the 13th World Conference of the International Council for Distance Education.* Melbourne, Australia: LaTrobe Micropublishing.

Lam, Y. L. J. (1985). Exploring the principles of andragogy: Some comparisons of university and community college learning experiences. *Canadian Journal of Higher Education, 15* (1), 39-52.

McCombs, B. L. (1985). Instructor and group process roles in computer-based training. *Educational Communication and Technology Journal, 33* (3), 159-167.

McLuhan, M., & Fiore, Q. (1967). *The medium is the massage: An inventory of effects.* New York, NY: Bantam.

Merrill, M. D. (Ed.) (1971). *Instructional design: Readings.* Englewood Cliffs, NJ: Prentice-Hall.

Mizell, A. P. (1978). Getting faculty involved in instructional development. *Educational Technology, 18* (6), 40-42.

Moses, I. (1985). Academic development units and the improvement of teaching. *Higher Education, 14* (1), 75-100.

Romiszowski, A. J. (1981). *Designing instructional systems.* London: Kogan Page.

Roueche. J. E., & Snow, J. J. (1978). *Overcoming learning problems.* San Francisco, CA: Jossey-Bass.

Salomon, G. (1979). *Interaction of media, cognition, and learning.* San Francisco, CA: Jossey-Bass.

Shaw, B., & Taylor, J. C. (1984). Instructional design: Distance education and academic tradition. *Distance Education, 5* (2), 277-285.

Shrock, S. (1985). Faculty perceptions of instructional development and the success/failure of an instructional development program: A naturalistic study. *Educational Communication and Technology Journal, 33* (1), 16-25.

Sprecher, J. W., & Chambers, J. A. (1980). Computer assisted instruction: Factors affecting courseware development. *Journal of Computer-Based Instruction, 7* (2), 47-57.

Stubbs, J., Lumsden, B., & Knapper, C. (1985). Education and bi-modal institutions. *Proceedings of the 13th World Conference of the International Council for Distance Education.* Melbourne, Australia: LaTrobe Micropublishing.

Sweeney, J. J., & Reigeluth, C. M. (1984). The lecture and instructional design: A contradiction in terms? *Educational Technology, 24* (8), 7-12.

Vedros, R., & Foster, R. E. (1981). Trouble-shooting instructional programs. *Educational Technology, 21* (4), 9-17.