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Chapter 1

INTRODUCTION: FROM CORRESPONDENCE TO VIRTUAL LEARNING ENVIRONMENTS
Margaret Haughey, Terry Evans, and David Murphy

A handbook on a subject needs to encompass the substance of the field and its traditional practices, as well as its contemporary forms, concerns and contexts. In planning this handbook, we made these matters central to our task. We were keen, however, that we made room for critique and for some prospective thinking on the part of our authors. Each section of the book concludes with a critical chapter, where the authors have been asked to reflect on the topic of the section and to adopt a "critical edge" to their writing as they saw fit. Such an approach does have roots in distance education, in particular, to the publication in 1987 of Openness and Closure in Distance Education (Harris, 1987), and in 1989 of Critical Reflections on Distance Education (Evans and Nation, 1989). This handbook recognizes this "tradition" but also seeks to advocate the continuation of critique within the field, especially in these times when the "end-users" of distance education's "products" (graduates) appear to be exercising disproportionate influence over the curriculum, assessment and "delivery" of distance education, at the expense of a tradition of distance education being for the intellectual and educational betterment of people who were effectively excluded from "traditional education" and needed some "access and equity" in their lives. Wedemeyer's (1981) work entitled Learning at the Back Door: Reflections on Non-Traditional Learning in the Lifespan used the folksy notion of peoples' education arriving "at the back door", which was very much about access. Faith's (1988) edited collection Toward New Horizons for Women in Distance Education: International Perspectives had a sharp focus on gender-equity. We argue that these are not just important features of the history of distance education. The contexts and circumstances may have changed to a degree, but social inequality remains as pervasive as ever and distance education has the means to address the educational bases of much of this inequality.

We wish to discuss the origins and transitions of distance education, as it has been formally known since 1982, when the International Council for Correspondence Education (ICCE) became the International Council for Distance Education (ICDE). It is said that distance education includes "various forms of study which are not under the continuous immediate supervision of tutors present with their students in the same room but who benefit from the planning, guidance and tuition of a tutorial organization" (Holmberg, 1977, p. 9). This definition stresses that distance education is formal study supported by an educational organization as opposed to informal education; that it involves the separation of learners and teachers in real space; and that learners receive planned and guided tuition (by implication, in some mediated form) through non-contiguous communication. Subsequent definitions by various theorists have stressed the relationship between teacher and student rather than the separation, have ignored the formal organizational aspect, have been concerned with learner autonomy and prescribed materials, have defined it as an industrialized form of education, and have placed emphasis on the technology mediation rather than the guidance and tuition.

During the last 25 years, proponents and practitioners have tried to illustrate the underlying principles behind their understandings of distance education. Some have proposed theories with testable propositions while others have suggested models that are based on guiding principles. Their intent has been to grapple conceptually with a rapidly changing
phenomenon that prior to 1982 had been categorized as independent or correspondence study and had depended on books, paper and the post. Even then, the development of large-scale correspondence institutions had raised pedagogical issues concerning the extent of student interaction and independence. Rapid changes not only in technology but also in our conceptions of society and learning have occurred during this time. It has resulted in the development of very large dedicated distance education institutions serving over 100,000 students and in the addition of distance learning options by conventional institutions.

Keegan (2000) identified four societal characteristics - immediacy, globalization, privatization (where the sense of community has been replaced with a focus on the home) and industrialization - as influencing the provision of distance education and training. We would add the imperative to lifelong learning as an aspect of training for the knowledge society and the impact of rapidly changing post-industrial systems. These, combined with demands for increased learner choice and flexibility and the technological possibilities of rapid feedback, mobility, multimedia and the Web, have resulted in the promotion of distance learning as a cost-effective alternative. As a number of authors (Hannafin and Kim, 2003) have commented, the adoption of some form of technology-based provision has more often focused on the attributes of the technology than on the underlying theoretical frameworks. We believe that with notable exceptions writers have ignored the socio-economic context that framed their analyses. However, despite this, these theories do help us see the concepts and questions that concerned distance educators over this period. In this chapter, therefore, we review and discuss the various distance education theories and models developed over the last 30 years and then place those models within contemporary discourses.

**HOLMBERG'S GUIDED DIDACTIC CONVERSATION**

One of the first major theorists of distance education was Holmberg (1976, 1983, 1995), who identified the presentation of learning matter, student-tutor communication, information technology and media, organization, and evaluation as components of any distance education system. Of these, Holmberg noted, "the communication element is rightly considered a cornerstone of distance education" (1986, p. 54) He proposed a conversational theory as the pedagogical model for distance education.

My theory implies that the character of good distance education resembles that of a guided conversation aiming at learning and that the presence of the typical traits of such a conversation facilitates learning ... There is a constant interaction ("conversation") between the supporting organization (authors, tutors, counselors) and the student, simulated through the students' interaction with the pre-produced courses and real through the written and/or telephone interaction with their tutors and counsellors. Communication is thus seen as the core of distance education.

(p.55)

This model involved a number of assumptions about learning. First, interaction is at the core of teaching, facilitated in part by the materials that are designed to have students consider different opinions. This interaction which encourages a sense of belonging or rapport with the tutor and organization is provided by using a "friendly, personal tone" (1986, p. 122), making the study relevant to the individual learner's needs, and ensuring that the materials are designed to provide easy access to the study matter. Second, there is an interactive relationship among the student's sense of belonging, learning pleasure and motivation. Holmberg posits that learners who develop a positive relationship with their learning organization will find their
learning more pleasurable, this feeling in turn supports their motivation, and both facilitate their learning.

Holmberg identified a number of strategies to help establish a cooperative conversational relationship between teacher and learner. His list of characteristics of good materials includes opportunities for learner choice. The course objectives should engage the student in the evaluation of their relevance and in the selection among them. The structure should build on earlier learning. He emphasized the use of the personal pronoun ("You" rather than "The student"), of highly readable and engaging prose, and of graphics and print design strategies, which aided reading, argument and retention. He described writing in a discursive conversational style, providing lots of examples and questions that were to engage the learner emotionally and encourage an exchange of views. Tutors and counsellors were to be constantly available to students for questions and exchanges of opinions. He proposed self-check exercises for learners as well as frequent submission of assignments, and quick handling of these with friendly, helpful, extensive feedback to promote the rapport necessary for student motivation and support. Holmberg called his theory, guided didactic conversation. He was concerned that students have the opportunity to make active choices throughout the course, and he focused on the individual learner rather than on learning as a social activity. His theory is reflected in the design adopted by the United Kingdom Open University (UKOU) that was based on the development of well-designed print materials to support student-tutor interaction. As Thorpe (1979) from the BOD has noted, while the reading materials are designed for students in general, the tutorial system means that student and tutor work together as individuals.

At the time Holmberg proposed his model, the philosophical debates in education concerned two opposed views. One was the importance of supporting and encouraging the autonomous adult (Knowles, 1970) through greater choice and responsibility, and opportunities for unstructured interaction. The other was the more behaviourist position that educators should control the learning process and provide highly delineated materials that were designed to ensure that adult learners would be successful. Holmberg chose to include both well-designed materials and individual discussion and feedback as elements of his model. Moore also attempted to integrate these differing perspectives.

**MOORE'S TRANSACTIONAL DISTANCE**

Moore (1973, 1993) proposed a theory of transactional distance in which he sought to link notions of autonomy, interaction and structure. Moore based his definition of transaction on Dewey's notion of the "transactions" between teacher and learner and it was the distance that could be present in that relationship that Moore sought to capture in his term, transactional distance. For Moore, distance was not a geographical phenomenon but a pedagogical concept, involving "the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/or by time" (1993, p. 22). He saw it as having three constructs: the extent of structure in the instructional design of the course, the extent of the teacher's interaction with the learner and the extent of self-directedness of the learner. These interact in the psychological and communications space resulting from the separation of teachers and learners. Moore termed these three inter-linking components structure, dialogue and autonomy. Structure referred to the level of openness or closure in the architecture of the course design. This included the course objectives, content and evaluation and hence involved the pedagogical philosophies of the instructor and designers. Dialogue referred to the opportunity for communication between learners and teacher and was influenced by the media choices and number of learners in the course, while autonomy meant the degree of freedom learners had to make course design choices. In delineating his model, Moore proposed that as student
autonomy increased, i.e. when learners had more choice about what and how to study and about how they would be evaluated, then transactional distance, i.e. the extent of structure and dialogue should decrease. Such learners he contended are able to work successfully with less design structures and less frequent interaction with the instructor.

Subsequently, Moore and Kearsley (1996) noted that sometimes highly structured courses were necessary depending on the students' initial understandings and that the amount of autonomy may increase over the length of a course. One problem with Moore's model is that using very specific descriptors for common terms like "dialogue", "structure" and "autonomy" can be confusing. Autonomy for Moore is at one level about the choices presented to the learner but at another level, autonomous learners are those able to make and be comfortable with their choices so that autonomy moves from being a property of the course to being a property of the student. Similarly, while structure refers to how the course was designed, it also carries the connotation that highly structured courses are not open to learner choice, confusing structure and control.

While Moore was particularly concerned about student autonomy, Holmberg focused on the instructional materials and their capacity for interaction and motivation through interactive designs. Holmberg's work reflects his experiences in a large print-based institution with correspondence study while Moore's work reflects the importance of independent study to US institutions. However, Moore's work, like Holmberg's, speaks to three important elements in distance education theory: the design of the learning materials, the extent and kinds of communication and the choices available to the learner. The ways these three variables are configured in a distance education course or program are influenced not only by the pedagogical philosophies of the instructor and designers but also by the organizational and cultural contexts.

PETERS'S INDUSTRIALIZATION MODEL

The socio-economic context played a large part in the conceptualization of distance learning by Peters (1983). He had initially attempted to characterize distance education into its different forms of instruction such as by writing, by using printed material, by using teaching aides, communication of knowledge by radio, etc., but found that these 27 different forms did not identify the specific structure of distance education. Then he tried to formulate a definition based on the six aspects of a structural definition of instruction, i.e. aims, content, methods, media, etc., which proved equally unproductive. Ultimately, he looked at the separation of the preparation of materials from the instruction, the use of formalized and standardized procedures in the development of materials, the use of efficient, mechanized, mass production processes, and concluded that distance education was a more industrialized form of teaching and learning. Therefore, Peters defined distance education as

a rationalized method - involving the division of labor - of providing knowledge which, as a result of applying the principles of industrial organization as well as the extensive use of technology, thus facilitating the reproduction of objective teaching activity in any numbers, allows a large number of students to participate in university study simultaneously, regardless of their place of residence or occupation.

(cited in Keegan, 1994, p. 125)

While Peter's delineation which focused on the production of the materials and the infrastructure supporting their provision was helpful in explaining the development of distance education institutions as reflective of contemporary industrial society, it avoids the issue of the
pedagogical assumptions underlying such a model, a point taken up by Harris (1987) in his
critique of the processes at the United Kingdom Open University (UKOU). Harris argued that
"Distance education and educational technology do have liberating sides but their current forms
prevent them from emerging fully" and called for them "to be recolonized from below,
subjected to the widest possible discussions instead of being isolated as anomalous to the
mainstream of higher education, or treated as the latest enthusiasm of the rationalizers" (p.
ISO). This seeming misalignment between industrialized forms of production involving course
teams of content specialists, instructional designers and educational technology specialists and
the individualized interaction with the tutor, referred to by Thorpe, points to the difficulty of
using exclusively either macro- or micro-based theories as reflective of distance education.

Unlike Holmberg and Moore whose models consider the learner, Peter's original two
developments were entirely from the perspective of the teacher while his third reflected the
larger contemporary context. Subsequently, he sees his interpretation as reflecting the
developments in the 1970s to 1990s and notes that as we move into a post-modern era, new
models need to be developed (2002, p. 23). New developments in technologies also posed
difficulties for Holmberg and Moore's models. The 1980s saw the advent of various forms of
audio and video conferencing, which introduced group processes into what had been
conceptualized previously as essentially private study. Garrison based his model on the
communicative advantages these new technologies could provide.

**GARRISON'S TWO-WAY EDUCATIONAL TRANSACTION**

While Holmberg and Moore stressed the separation of teacher and learner as integral to
distance education, Garrison (1989) stressed the importance of two-way communication
among students and with the teacher. He proposed that it was a mistake to define distance
education through its differences from conventional education and hence, to focus on ways to
overcome the separation or distance; instead, he defined distance education as "a species of
education characterized by one structural characteristic - the noncontiguity of teacher and
student" (p. 8). His two other defining criteria were two-way communication and technology
mediation (Garrison and Baynton, 1987, p. 11). He did not include reference to a formal
organizational presence, partly because he considered the presence of an institution to be
irrelevant to the actual relationship between the teacher and the students and because
increasingly, distance education courses were being offered by traditional institutions.

Garrison (1989) proposed a model based on the educational transaction between teacher
and learner but focused on dialogue and debate as being essential for understanding and hence
necessitating two-way communication between them. He rejected Holmberg's emphasis on the
interactive quality of the print materials as being a simulation for interaction with the instructor
and insisted that mediation through technology was an essential component of distance
education. Garrison defines his model as a triangle linking teacher, student and content. The
two-way linkages between teacher and student are termed dialogue, i.e. discussion and
negotiation for meaning and personal understanding, and the link between teacher and content
is labelled structure referring to the preparation and packaging of content. Garrison (1989) also
proposed that the concept of learner autonomy be replaced with learner control as a more
precise construct involving the learner in "influencing educational decisions" (Garrison, 1993).
However, he argued that learner control was not one-way but involved, and had implications
for, others so that it needed to be shared between teacher and learner and renegotiated
throughout the learning process. Garrison and Baynton (1987) had proposed that the construct
included three concepts: learner independence, proficiency and support. Independence referred
to the learner being "free to choose and pursue educational goals" (p. 27).
In a later discussion, Garrison redefined it as the learner "assuming responsibility for constructing meaning in a collaborative or interactive setting" (1993, p. 16). Proficiency referred to the learner's ability to be self-directed, and support meant the availability of the necessary human and non-human resources. He superimposed this conceptualization on his initial model so that support was provided through the dialogic relationship between teacher and student, while proficiency was linked to the student's work with the content, and the student's level of independence or self-directedness was evident in the level of structure the teacher had imposed on the content. He strongly supported sustained interaction as essential to the development of critical learning and saw the role of the teacher as essential to the process.

Garrison's concepts of dialogue, structure and control built on the concepts identified by Moore but while Moore used them to try to identify what was unique about distance education, Garrison used them as a means of dissolving any differences. His model could be applied successfully to an analysis of classroom instruction. Garrison's highlighting of the importance of two-way interaction reflected the new developments of group communication technologies. These were a way to bring the campus to the students and to provide a form of education that was similar to what was available in traditional classrooms. These practices have been called "classrooms at a distance" since in many instances, the use of technology is all that marks them out from other on-campus offerings.

LAURILLARD'S CONVERSATIONAL FRAMEWORK

A similar focus on aspects of the learning situation was delineated by Laurillard (1993, 2002), who saw "learning as a relationship between the learner and the world mediated by the teacher" (2002, p. 86). She set out a conversational framework which contained the requirements for any learning situation; it had to be "an iterative dialogue", "discursive, adaptive, interactive and reflective", "operate at the level of descriptions of the topic", and "at the level of actions within the related tasks" (p. 86). Her model is a rectangle. Like Garrison, she begins her model with two adjacent corners of the model linked with a series of two-way arrows designating the dialogue between teacher and student. She refers to them as "Teacher's conception" and "Student's conception". Linked to the teacher's corner is the "Teacher's constructed environment" (the context for the student's actions) and to the student's, "Student's actions". These four points form the rectangle. Laurillard used three concepts to activate her model: adaptation, interaction and reflection. Through interaction and reflection, there is ongoing adaptation for both teacher and learner.

Adaptation is the process of considering, reflecting, reiterating and changing actions based on what is received from the other person in the dialogue. This occurs simultaneously in both the teacher's and the student's conceptions as they interact and it is visible in their ongoing dialogue and in the student's actions. Interaction is part of adaptation and involves the teacher setting the task, the student doing something to achieve the goal, the student obtaining feedback on the action from the teacher and both student and teacher modifying subsequent actions. Reflection occurs internally as both the teacher and learner reflect on the experience, each adapting and changing their understanding of the task and the goal for future actions and revealing this in their dialogue. Laurillard used this model in identifying the learning experiences that were best supported by various media and concluded that no medium can provide all aspects equally well. Instead, a range of media should be used depending on the goals and tasks. Laurillard's model focuses only on the interactions (descriptions and tasks) between teacher and student that are integral to the learning process and like Garrison, the teacher is essential to the process.
Laurillard sought to delineate the actual learning process. She made interaction between teacher and learner integral to this process and included internal learning processes of adaptation and reflection as well as external discussion and action. Through these adaptive processes she captures the notion of control as discussed by Garrison. Garrison's model although also focused on the learning sequence is more general, separating content from dialogue and student choice, while Laurillard sees choice as embedded in the interactive process provided through the dialogue itself. Adaptation from Laurillard's perspective is less about control than about ongoing negotiation as a process of iterative communication. Also, unlike Garrison who argued for the "crucial and necessary role of the teacher" (1989, p. 35), Laurillard notes, "The dialogue may never take place explicitly between teacher and student. It could be a kind of internal dialogue, with the student playing both roles" (1993, p. 104) as it is when students reflect on lecture notes. Garrison's response would be that "it is the challenging of perspectives and the presentation of alternative viewpoints that the student is not likely to perform adequately [and] independently" (1989, p. 35). In his 1993 discussion, Garrison placed even greater emphasis on these, noting that they reflected "the cog11itiveconstructivist ideal of an interdependent teacher-learner" (p. 13) which was emerging. He outlined the challenge for distance educators as being between the tradition paradigm of prepared materials for independent learners and the emerging paradigm of sustained collaboration for meaning-making.

**VARIOUS LEARNING THEORIES**

The initial models of distance education were versions of traditional education, and were based on adaptations of the traditionallecture/discussion model to a distance education situation. Expertise was provided through print materials, or through audio or video-conferenced lectures and discussion and feedback came through written assignments. Essentially, students learned individually and they did so through the content provided by the instructor and through some form of iterative communication that allowed for adaptation. This is still the most common form of educational provision in post-secondary education.

It is based on what is now termed instructivism, i.e. teacher-directed teaching, where the teacher as expert decides what is to be known, how it is to be transmitted, and the criteria for evaluation. Student motivation and support are the responsibility of the teacher. The student's task is to learn and to reveal that knowledge for evaluation. As Thorpe (1995) notes, course designers have, for two decades and more, been using a cognitive approach to learning and searching for ways in which learners can mobilize their existing knowledge and create new frameworks which integrate old and new learning in new forms of understanding. Advance organizers, in-text activities, tutor-marked assignments and project-based assessment are some of the approaches which assume a cognitivist model of learning.

(p.175)

Cognitivism also stresses the importance of the teacher in the instructional process but unlike instructivist approaches considers the learner to be an active participant in the construction and manipulation of mental models in learning even if knowledge is a given.

These orientations to education have been challenged by constructivism, which believes that knowledge is not a given; it cannot be transmitted but must be (re)constructed by each learner. Constructivism places interaction at the centre of the learning process. First, the interaction is between the learner's present knowledge and what the person is hearing or
observing in the surrounding context. The learner's prior meanings may be challenged in this situation and how the learner responds will influence others in the same context and their responses will also influence the learner. Hence, communication among learners is essential for meaning-making for the individual's learning is constantly shaped by what others say and how they react. Knowledge then is relative to the context and always open to question. There are two kinds of constructivism. Cognitive constructivism stresses the problem-solving aspects of individual knowledge-building while social constructivism focuses on the collaborative interaction among learners in their shared knowledge-building processes. In practice, these distinctions are less clear-cut. For one, the social context provides a supportive context of shared experiences while the other sees knowledge as constructed by and shared among the group rather than being concurrently constructed individually. However, the way people approach and solve problems is context-dependent, and more holistic and intuitive than logical (Winn, 1990) so that documenting these processes is difficult.

Both perspectives are oriented to problem-solving and critical inquiry. This means that instructors focus on the provision of a learning environment rather than on complete, previously designed, mass-produced course packages. Constructivist learning designs call for providing learners with realistic, meaningful, relevant, engaging, complex and information-rich resources to use in the process of meaning-making. Learners' interactions in aid of meaning-making are based on the higher-order thinking processes of analysis, synthesis and evaluation and should include creativity and experimentation. The learners should be given differing perspectives to consider rather than a single or dominant point of view. They also require incremental learning strategies such as scaffolding and sequencing of tasks to aid their knowledge-construction. Assessment should be authentic, using realistic tasks and providing feedback not only on content knowledge but also on the learner's learning processes. Social constructivism not only privileges interaction but more clearly shares the responsibility for learning between the teacher who should provide situations for dialogue and learners who must interact with their own knowledge base and that of their peers to try to achieve mutual understanding. While learner characteristics are important in deciding on appropriate situations and materials, the focus is on learning, and so constructivism is seen as both learning- and learner-centred. Over the last decade, it has become increasingly accepted as the most appropriate set of principles to direct educational endeavours.

VRASIDAS AND GLASS'S CONCEPTUAL FRAMEWORK

Vrasidas and Glass (2002) adapted Moore's theory and Garrison's model to reflect a constructivist orientation. They proposed a model with three concentric frames; in the centre frame is interaction, surrounded by the instructional design and content and embedded in the outer context frame which contains the technology, institutional politics and the teacher. Interaction is described as a set of concepts-dialogue, learner control, feedback and social presence—which they do not link these together conceptually but see them as parts of a system. They define social presence as the extent to which the medium allows the learner to feel socially present in the mediated situation. They extend the definition of dialogue beyond being a conversation between learner and teacher by including the four types of mediated interaction (Hillman et al., 1994; Moore, 1989) - between learners, with the teacher, with the content and with the machine interface - to highlight "the importance of technology in mediating and shaping interaction" (pp. 38-9). In the instructional frame, they point out that structure is dynamic, changing through negotiation as the course proceeds (p. 45). The outer frame is the context within which the rest occurs. It is both separate from and part of the process, ranging from institutional policies and teachers' philosophies to the attributes of the technology, all of
which constrain and shape what is possible. They define technology broadly, listing the wide variety of technologies used in distance education.

Vrasidas and Glass are concerned to delineate a model that relates to the specific circumstances of distance education. Therefore they place interaction at the centre of their model and expand the traditional teacher-learner-content interactions to include student-interface interactions. They also point out that there is a difference between teacher-learner interactions and teacher-group interactions and suggest a distance learning model should address this option also. Their focus on technology is not meant to place technology ahead of learning but rather that research studies should focus on "how technology affords certain kinds of interactions and shapes content, context, interaction, and learner experience" (p. 50). They question whether the focus on social presence is part of the trend to replicate the "face-to-face ideal" (p. 42) and challenge the extent to which social presence is deemed necessary for individual learners, suggesting instead that while some learners seek a highly supportive and interactive environment, others may prefer one that is less so. They note their disagreement with Moore, contending that structure does not necessarily reduce dialogue. They give the example of required collaborative projects that increase interaction. Overall, their conceptual framework, as a series of concentric spaces, reinforces the interrelatedness of interaction within an instructional and organizational context.

**GARRISON, ANDERSON AND ARCHER'S COMMUNITY OF INQUIRY MODEL**

Garrison et al., (2000) designed a model for distance learning that returns to their core concept of two-way communications and whose goal is critical thinking. The model is premised on the notion of a community of inquiry and designed specifically for computer conferencing environments. The community of inquiry (or critical thinking) is formed through the interactions of teachers and learners and has three essential components: social presence, cognitive presence and teaching presence. Social presence refers to students' sense of their online identity as group members through their interactions with each other and the instructor. It is obtained through engaging, positively reciprocated interactions that recognize the contributions of others and include affective aspects such as humour and self-disclosure. These interactions, however, should be focused on the social construction of meaning, the focus of cognitive presence. Garrison et al., (2000) define cognitive presence as "the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (p. 89). They delineate a problem-oriented approach involving learner interest, engagement, exploration and resolution as four stages of cognitive presence. Teachers guide learners through these four stages through participation in the learning process. Teaching presence includes the design and organization of the learning sequences, the facilitation of interaction and active learning and the provision of subject matter expertise. It is labelled teaching rather than teacher presence, since learners can undertake some of these functions. Based on this model, they "hypothesize that high levels of social presence with accompanying high degrees of commitment and participation are necessary for the development of higher-order thinking skills and collaborative work" (p. 94). Also, "when social presence is combined with appropriate teaching presence, the result can be a high level of cognitive presence leading to fruitful critical inquiry" (p. 96).

Unlike other distance learning models that did not specify particular technologies although the technologies then available are evident in their formulation, this model addresses a specific rapidly growing technology, computer conferencing. However, as is evident from
Garrison and Anderson's earlier work, the model predates its application to computer conferencing environments. Garrison et al., (2000) have argued that the concept of a community of learners focused on critical thinking is only viable via computer conferencing if the three elements are present. However, the elements are defined in such a way that it is not always clear whether they are an attribute of the participant, of the learning design or of the technology. For example, social presence is described as "the ability of the participants ... to project their personal characteristics into the community thereby presenting themselves to the other participants as 'real people'" (p. 89), while cognitive presence is "the extent to which participants are able to construct meaning through sustained communication" (p. 89). However, from the subsequent description of social and cognitive presence, it is evident that participants require not only the ability but more importantly the opportunity to project themselves socially and emotionally and to negotiate meaning with the other group members. High levels of ability alone would not help fulfil the hypotheses.

Garrison and his colleagues see the constraints on cognitive presence as partly dependent on the technology itself while the communicative norms established by the group rather than the technology is "the most salient factor in determining the degree of social presence" (p. 94). They further argue that there needs to be "a significant degree" of social presence for cognitive presence to be sustained. Garrison et al. see sharing as an essential aspect of critical inquiry since cognition can't be separated from its social context.

Their model is less clear in its comparative delineation of cognitive and teaching elements. Cognitive presence, seen as the core element, focuses on the learners' problem solving activities while teaching presence refers to the design (subsequently referred to as instructional management), direct instruction and facilitation activities that support this process and that are usually attributed to the teacher. The overlap is labelled "supporting discourse" which Anderson et al., (2001) define as establishing and maintaining knowledge-based deliberations and supporting and encouraging participation through management of the learning space. The overlap is extensive since the teacher's instructional and facilitative activities are essential to the level of analysis sought in the cognitive activities and help sustain the socio-emotional context. For example, the learner's cognitive search for information for clarification and integration is integrally connected to the teaching presence role. In addition, the differentiation of cognitive presence to highlight the cognitive aspect of learning seems to suggest that the ongoing negotiation of meaning is an activity of the learners alone rather than of the teacher also. Similarly, separating the affective from the cognitive aspects of learning downplays the holistic, embodied characteristics of learning. Furthermore, little emphasis is given to the context in which this learning occurs. Vrasidas and Glass (2002) contend that interaction is not a variable one extracts from a context but rather that it is "an ongoing concept that resides in a context and also creates context" (p. 34). Both cognitive and teaching sectors seem to have similarities with Laurillard's more integrated adaptation process. Why these two sectors are called "presence" is also not obvious apart from the harmony of the sectors' names.

The importance of the learners' social context in learning and the concurrent rapid growth of computer conferencing have resulted in numerous programs and research studies that focus on interaction, collaboration and community (Duffy and Kirkley, 2004). The sustaining questions have been about the ways to use technology to achieve these three goals whether for classroom or distance learners. What are less evident are questions about how the learning style of the individual learner and learner control are accounted for, how different media influence learning models and what combination of content and context can best be accessed through learner-content rather than through learner-human interactions. These questions are taken up by Anderson.
Anderson's Equivalency Interaction Theorem

Anderson (2003) bases his model on the Anderson and Garrison (1998) version of Garrison's 1989 model. He begins by enumerating the three components added in the 1998 version to the triangular model of student, teacher and content, where learners interact not only with teacher and content but also with other learners. Similarly, teachers also interact with other resource people and content interacts with other content. However, in his latest model, Anderson (2003) does not separate interaction from content and instead places knowledge/content/interaction as an interface between the learner and the teacher. In this he is recognizing the mediated nature of the knowledge-based communications between the teacher and the learner. He includes links of students to other students and the teacher to colleagues and other resource people. He then provides two examples of the use of particular technologies and learning activities that illustrate his model. To the left, he outlines a learner-content-teacher linkage that privileges learner-learner interaction. He describes those web-based courses where synchronous and asynchronous conferencing is the basis for paced, collaborative learning involving the teacher and learners in a community of inquiry model. He notes that "the high level of student-student interaction capacity allows for reduced student teacher interaction ... and facilitates students sharing and discussing student-content learning resources gathered or created by students" (p. 7). Anderson notes that community of inquiry environments "encourage the development of social skills, collaborative learning and the development of personal relationships amongst participants as components of the learning process" (p. 8). To the right, the learner-content-teacher linkage privileges learner-content interaction. He describes the traditional distance education model that has migrated to electronic communication. It includes independent study and structured learning resources from e-books and tutorials to simulations, games and virtual labs. To these he added peer, professional and family support. Anderson explains that "although engaged in independent study, the student is not alone" and is likely to have an informal support group of friends, peers and family. In this version, students can but seldom do engage in academic discussions with their tutor. Also, "student-student interaction is minimized allowing for maximum flexibility, start and finish times for courses, and capacity for students to set their own pace through the learning content" (p. 6).

Using these two examples, and based on his model of student-student, student-teacher and student-content interaction, Anderson then proposes that "deep and meaningful learning is supported as long as one of the three forms of interaction is at a high level" (p. 3). He goes on to elaborate that an instructional designer can substitute one type of interaction for one of the others with little loss in educational effectiveness (p. 4).

Unlike Vrasidas and Glass's (2002) model or that of Garrison, Anderson and Archer (2000) which are based on constructivist learning principles, Anderson's model returns to the broader issue of mediated or distance learning and the various possibilities available. In placing the resources, materials and communications as the interface between the instructor and the student, he has broadened the notion of content to being inclusive of all three rather than separating out teacher-learner interactions from knowledge-based interactions or interactions with structured course materials. The two examples he gives use learning designs that are based in differing philosophies of learning. In the social constructivist design to the left, learning is believed to occur primarily through interaction with others facilitated by the teacher. The course materials, like students' experiences, are resources to encourage reflection, sustained discussion and meaning-making. In the cognitivist design to the right, learning occurs through interaction with the resources and with the teacher. As Heinecke et al., (2001) point out, basic beliefs about education influence how courses are designed and ultimately the roles of the teacher, students and content. Anderson's model is an attempt to reflect the diversity of actual and potential practices rather than a single orientation.
In this he is influenced by three concerns. First, he is interested in the migration to student-content interactions. He suggests that given the computer's increasing storage capacity and computing power and the comparative higher costs of learner-human interactions, some activities that are now student-teacher interactions will migrate to being student-content interactions. One example is that student-teacher queries, now in e-mail and computer conferencing formats, are moving to FAQs (web-based prepared responses to frequently asked questions), and to teacher demonstrations (online video clips or learning objects). This migration has the advantage of consistency, immediacy and flexibility. The responses are similar for all learners and learners can access them when they need them. They can also be individualized to better reflect a learner's competency level or specific learning needs or to provide personalization of interactions. Similarly, automated computing components can look after accounting and clerical tasks originally categorized as teacher-learner interactions.

Second, he believes that learners vary in their needs for flexibility and engagement in group-based learning. The community of inquiry model binds learners together within regular timeframes to interact in group-based activities. The issues of the centrality of interaction, and the extent to which communities develop in this context, have been the foci of multiple research studies. From the many case studies, context, task and purpose appear to be the most important variables (Hannafin and Kim, 2003) but like Vrasidas and Glass, Anderson questions the ubiquity of this particular design for all learners. Third, Anderson is concerned with the scalability of distance education models. He points out that since the number of students in an online, conference using the community model is generally limited to fewer than 30, community-based models are inherently more expensive and "suffer from an inability to scale to large numbers of learners" (p. 8). He argues that we should "be focused on creating the most cost effective and accessible alternatives" that can scale to meet the burgeoning demand for distance learning and that this will mean reducing the amount of teacher-student interaction, and replacing it with increased student-student and student-content interactions. His contention is that these interactions can be as educationally effective as asynchronous communications although he also recommends that given the variety of learners in any situation, designers should incorporate and design activities to encourage "strategic amounts" of each of the three types of interaction (p. 5).

INTERACTIVE, SELF-PACED AUTONOMOUS LEARNING

The issue of learner choice is evident in Anderson's model, and in particular, in the example on the right. Learner choice or autonomy, an integral aspect of distance education for Moore, is seen by Peters (2001) as occurring when the learners take over the functions of the teacher and take control of their education. Peters argues that to do this the learners need to have metacognitive skills including critical contemplation, and to be motivationally and actively involved in their own learning. Constructivism argues that individuals "construct" their own knowledge networks rather than replicating an external reality and that they do this through a recursive process of internal and external dialogues seeking internal accord with their own experience and external agreement with others. This requires that the learning environment provide opportunities for learner autonomy and responsibility and that the teacher focus on developing the metacognitive skills the learner needs so as to be able to critique, analyse and synthesize from many differing sources and points of view. These are the skills of critical contemplation which provide the basis for emancipation and transformation.

Learners' engagement with the computer is unlike their involvement in other pedagogical forms. Already we take for granted that the virtual space we "call up" on the computer screen is an unlimited series of temporary, non-existent images usually in 2-D space,
generated by computer software, in which the immediacy of tele-presence replaces our sense of distance. Furthermore, we, in part, control what we see. We use metaphorical terms for objects such as bulletin boards, desktop and recycle bin, and locations such as virtual classrooms, laboratories, libraries and coffee shops because we have a need to place these temporary spaces in some temporal location where the social norms for that object or place are an accepted part of our virtual activity. We have access to unlimited resources at our fingertips. We can scan, browse, skip, backspace and store what we find. We have a sense of immediacy and responsiveness, of control and choice, and of the opportunity to browse and search. The functions we employ can be divided roughly into four. First are the skills associated with the use of the computer’s text-based programs involving composing, editing, storing and retrieval. Second are the communication functions involving messaging via e-mail, bulletin boards and in conferences and the posting and responding skills required. Third are the skills associated with obtaining resources through browsing, searching, following links and assessing information and integrating it with other knowledge. Fourth are the imaginative and creative skills associated with participating in simulations and virtual reality environments such as MUDs and MOOs. Essential are the metacognitive skills that we use to interpret these momentary happenings, to assess their worth and to integrate them into whatever topic we are coming to know. These learner-driven activities are changing our understanding of learning and of the combination of resources and activities we call virtual learning environments.

THE POSSIBILITIES OF VIRTUAL LEARNING ENVIRONMENTS

Virtual learning environments have been defined as "advanced, flexible, social systems, supported with ICT" (Koper, 2000, p. 2). As Peters (2001) and others have identified, virtual learning environments provide increasingly complex pedagogical structures and are powerful tools for independent as well as collaborative learning. Koper (2000) identified five characteristics of virtual learning environments: representation, personalization, integration, cooperation and process management, each of which has an influence on pedagogical design. Personalization focuses on the needs of the individual learner. Since constructivist learning principles are based on meeting the differing learning needs of individuals, there has to be relevant individualization of various aspects of the process. Anderson (2003) referred to customized instructions, advice, methods and assignments as some examples of personalization. He noted, "student-content interaction is most accessible, and most readily adapted, via individualized "student portfolios" that can influence design, assessment, or delivery customizations" (p. 4). Students' learning styles and needs can be stored in a personal profile that is used by the computer software to customize responses to student queries. By reducing the amount of redundant materials, the learner is better able to focus on the task at hand. This is often referred to as adaptive instruction and may range from adapting goals and resources to providing opportunities for self-testing or for tutorial help.

Integration refers to the seamless way the course appears to the learner due to the properties of the computer, which can integrate files from people in different places and times. The learner can be time-independent and access the course at any time; time- and place-independent and communicate asynchronously; or place-independent and use video or audio computer communications. Connectivity, the sense of being connected to other learners has become a key term in research on computer-based communications. Integration also allows for the efficient handling and sharing of files stored in a central location among distributed personnel.
Cooperation refers to collective work on an object or report, usually through shareware. One variation is CSCL, computer supported collaborative learning which explores the ways socially constructed knowledge can be electronically distributed in solving common problems. The cooperation is usually self-managed by the group members. Koper identifies characteristics that can limit or derail cooperative activity including conflicts, counterproposals, uneven sharing of the workload and appropriation. Anderson (2003) also referred to the issues surrounding cooperative conferencing noting that some students did not find this a helpful pedagogical approach because of the time-bound dimension. It is evident from the literature that designing, facilitating and participating in appropriate learning activities involving collaboration or cooperation is part of a new skill repertoire for learners and teachers.

Representation is the capacity of the computer to provide a simulated environment that reflects actual situations but does not involve actual people. The video game industry is based on this capability. While large-scale simulations are often expensive, smaller segments of situations, called learning objects, which draw learners into the situation and encourage manipulation of the environment, are becoming increasingly common. One characteristic of learner participation in simulations is that the learner is a participant in the process and must make decisions with visible consequences. Again, Anderson (2003) mentioned the use of virtual labs, which would be one example of remote involvement in actual and virtual situations. However, he commented that "the value of the content is dependent on the extent to which it engages students or teachers in interaction, leading to relevant knowledge construction" (p. 5). He linked the capacity for interaction with resulting engagement, mindfulness and motivation, as do Duffy and Kirkley (2004).

Process management is an attribute of computer software that reduces complex forms of work and makes them manageable. Virtual learning environments that personalize learner activities or materials or that use alternative pedagogical features such as portfolio assessment generally require a complex administrative and management structure which can be computerized. Process management is meant to reduce the complexity for the learner and for the teacher. It can manage workflows, identify problems, collate information and provide information, resources or tasks appropriate to the particular situation. Anderson (2003) noted that computers could take over teacher's administrative tasks such as collating and sorting marks. For Peters (2002) it is the capacity of the virtual environment to provide different learning opportunities rather than the same pedagogical designs in a different media that is the attraction of virtual learning environments.

**COMMENTARY**

Anderson's call for more discussion within our community of practice is welcome and important. In a previous analysis of a number of these theories, Amundsen (1993) identified the general theme of communication and an emphasis on the adult learner. She noted the different conceptions of distance, from geographic to pedagogic, and the move to focus on the educational transaction, evident in Moore's (1973) and Garrison's (1989) work. Sauve (1993), from a similar analysis, grouped the theoretical models into two main fields: those that focus on student autonomy and independence and those that focus on interaction and communication. She also noted the different views of separation, the constant comparison to classroom teaching, and the lack of an over arching model. She identified four constants in the various theories: communication, distance, technologies and planning and organization (p. 102). Since available technologies influenced the various models, Sauve grouped them as those focused on individualized study with limited teacher-learner interaction (for example, Holmberg 1983;
Moore, 1973) and those who saw technologies as closing the gap between teacher and learner (Garrison et al., 2000; Garrison, 1989; Vrasidas and Glass, 2002).

Theories reflect the philosophical beliefs of their authors and much of the theoretical work described above has reflected the modernist search for the overarching theory and its postulates. Gibson (1993) commented on the lack of recognition of context in these theories. She proposed more emphasis on the lifeworld of the learner, such as the influence of the family circumstances, the impact of gender, and the competing time demands of work and learning. Most of these analyses did not include Peters's work. One of the reasons that theorists may have had difficulty with Peters's model is that it was based entirely on the impact of the context on distance education, the penetration of industrial processes into the traditional provision of education and the workplace changes it brought about.

Even when the context has been ignored, distance education theories reflect their social context and values. By and large, the discussions of the last 30 years have been framed within the discourse of increasing access. Distance education has been promoted as a cost-effective means to overcome funding restraints to meet the demands of increasing numbers of students. At the same time that discourse of provision is being overlain by a discourse of lifelong learning, which proposes that people should have opportunities to learn throughout the life span. Distance educators have supported the discourse of access while being frustrated at some of its aspects. Within the mass production and large-scale provision of materials to students, distance educators have sought to recognize the multiple realities of students' lives and ensure alternative choices. And yet the model of large-scale provision limits those possibilities and reinforces the notion that the boundaries of education are controlled by the institution.

The discourse of lifelong learning reflects the post-industrial order discussed by Peters (2002). It is based on the increasing demands for flexibility and choice, the replacement of large-scale production with smaller, niche-based industries, and the globalization of trade. It gives precedence to individuals rather than to institutions, according individuals not only a sense of autonomy and choice but thereby greater responsibility for the outcome of these choices. This discourse prefigures learners as consumers and highlights the utility of learning. However, learners are not left to make these choices alone since employers' demands shape what learners may choose. The provision of education has become a marketplace, and there now is a wider range of providers. The concept of knowledge as being resident in stable bodies of knowledge has been challenged, as the boundaries of provision are reshaped to reflect these new demands. This uncertainty makes a place for situated knowledge and for greater diversity of information sources, but also challenges the identity of the learner.

The concept of the lifelong learner is one of choice and activity and hence identity formation is an ongoing process based on conscious reflection. We see these processes at work when we encourage learners to become increasingly aware of their learning processes, the better to shape them. Thorpe (1995) notes the use of Schon's (1983) work on reflective practice and suggests that we should encourage learners to develop internalized dialogues with themselves about their own learning processes. Overall, there is now much greater emphasis on the economic 'value of learning, and on learner choice. The state has taken a much greater interest in lifelong learning but has moved it from a social policy of emancipation to an economic model that it has then devolved to the market. This challenges the previous disciplinary boundaries of knowledge as new configurations are made available, and it also gives learners more opportunities to decide what constitutes practical knowledge. The concept of the lifelong learner supports individualized rather than communal learning and with information and communication technologies, learners have immediate access to information and can synthesize it for themselves, further challenging the foundations of institutional learning.
As distance educators, we place ourselves within these discourses, conscious that our actions can be interpreted as supporting either and yet recognizing that the process is complex and the meanings multiple and contested. We constantly renegotiate our positions, crossing back and forth across the borders of these options, as in Anderson’s (2003) model, recognizing that each privileges some and marginalizes others. The lack of a single theoretical model could be taken as a positive reflection of our acceptance of the multiple narratives that make up distance education. One of the characteristics of competing, overlapping discourses is the permeability of boundaries. For us this is evident between the dedicated providers of distance education and conventional institutions that also provide distance education and between distance education and what are termed "blended" or "mixed mode" courses. One outcome is that distance education itself is questioned and its absorption and convergence into traditional education is promoted. Our defining concepts of communication, distance, autonomy and planning and management that demarcated our field are being challenged and are being reinterpreted in different ways. While Sauvé concluded her analysis commenting, "Distance is still at the heart of distance education" (p. 105), others would argue that given the immediacy of telecommunications distance is no longer a relevant concept. One alternative is to encourage a much richer discussion that uses concepts from a broader range of fields, as Peters did.

Another facet of our times is the discourse of flexibility. Edwards (1997) contends that flexibility as a discourse has been used to promote changes throughout our society. He sees it as central to the demands for change in educational provision as well as in the restructuring of established educational practices that has been prevalent in the last decade. Flexibility has been used to argue that learning should be reformed to support lifelong learning and be more responsive to the needs of students and employers. It is used to promote distance education and has become a positive value. Those who do not respond are accused of being self-interested professionals lacking adequate accountability, and subject to what Ball termed the "discourse of derision" (1990). It is a discursive strategy used to argue that the issue for educational institutions is not increased funding but more efficient institutional practices that are more responsive to learners. Its discourse promotes access and increased provision while cutting real costs. We see it used also in support of such diverse trends as individual learning portfolios, prior learning assessment and student-centred learning.

As distance educators, the discourse on technology has been of particular importance. While McLuhan (1987) and Franklin (1992) among others have warned of the integral value-positioning of communications technologies, these technologies are often promoted as a neutral tool, an inevitable part of the knowledge society. By promoting them as merely natural developments, the actual impact of the technological change can be removed from criticism. Communications technologies have provided us with significant and contested possibilities for distance education. They have been used to support the globalization of information often of a dominant culture but as well, they have drawn people from far-flung locations closer together in relationships that recognize and promote diversity. Digital communications technologies have transformed our notions of space and time.

Each technological change forces us to reexamine the practice and the theoretical foundations of distance education and the advent of the networked computer has brought new challenges. On one hand, it has provided not only a means to reach more people at times and places convenient to them, but also new possibilities for the ways we design and provide learning environments. However, at the same time as the provision of e-resources supports learners' autonomous behaviour, it shapes learners' beliefs about autonomy as a preferred freedom through its use. In addition, while its asynchronicity can foster isolation and privatization (home versus a public location), it also provides the choice of conferencing with dispersed others and forming social bonds to support collaborative learning.
In describing the large-scale provision of distance education between the 1970s and the 1990s, Peters considered that it was the technologies of post and transport, which came into being with the Industrial Revolution that ushered in contemporary distance education. Before then, it was impossible on any large scale. More recently (2002), he has explored the possibilities and opportunities provided by digital learning environments. Peters contends that "there is no doubt that the digital learning environment can challenge students to more activity and intensified inter activity not only with regard to quantity but also to quality" (p. 63). Here Peters links aspects of virtual technology to parallel discourses on flexibility, activity and quality, or accountability. He is particularly interested in the challenges to the dominant pedagogical paradigm that these environments can provide. He sees a pedagogical process that has more of the attributes of personal research and proposes that "We are therefore confronted with a break with tradition never seen before. However we judge this process, the removal of the bonds above leads to a flexibility and variability of learning which was never before possible" (pp. 65-66).

Peters and Anderson find great possibilities in the virtual learning environment. Garrison et al., (2000) highlighted the possibilities associated with intense inter activity in their community of inquiry model. But there is still much that we can learn from earlier models. For example, two aspects of Holmberg's model continue to be important. One is his guidance concerning the ways to make print materials engaging and challenging to the learner which need to be reexamined as we develop digitized interactive resource materials. Second, the notion of empathic engagement which he proposed as the basis for his guided didactic conversation that was based on the work of Carl Rogers (1962), who identified three critical aspects of successful communication: open disclosure, warm affirmations and empathetic comprehension. This work could assist in the conceptualization and analysis of computer conferencing sessions that are meant to promote collaborative learning. As Burge (1995, p. 159) noted,

Collaborative learning ... does not happen just because people have been collected together. This connection relates to the synergy of learning: "creating a shared experience of learning is qualitatively different from helping individuals share their prior experience"

Johnson and Johnson, 1993, p. 146.

Similar links can be made with the other models to illustrate how they continue to help inform our multiple and diverse practices.

Finally, we argue that more attention is required to the discourse of knowledge/power. The permeability of traditional educational boundaries has already led to challenges to the profession as the source of knowledge. The possibilities of networked computers are also challenging our conceptions of the role of the teacher. Already we have had a change from the expository sage on the stage to the discussion-oriented guide on the side. But even with the emphasis on facilitation, the institution continues to control the boundary of knowledge. If we hesitate to adopt models of learning that encourage student autonomy more than student cooperation, or fear to include a teaching, rather than a teacher role, or are unwilling to differentiate the role of the teacher and share it with learning designers, educational technology specialists and tutors, then we need to ask ourselves why. We need to ask ourselves if it is that we fear the loss of professional control and whether new pedagogical models will provide for greater balance between the institution and the learner. How we weave our way among discourses of technology, flexibility, power, knowledge and lifelong learning will continue to influence the models of distance education that we create through our practices. As John Daniel noted recently, we hesitate to accept that distance education has become the flavour of the
month because once it becomes part of the dominant discourse we don't know how it might be used. But at least, we should be on our guard for how we understand distance education as a reflection of our own positioning in the competing discourses of today's society.

This handbook canvasses a wide distance education policy and practice that we have positioned for our purposes as editors of the collection. The section topics help frame the reading of the chapters, indeed, as they helped frame the writing. The previous discussion of the origins and connections of theories and practices of distance education enables the work of the contributors to be understood in both historical and epistemological contexts. It is the case, however, that many of the chapters have implications and connections across sections. The distance education community has been an international one for many years (see, for example, Sewart et al., 1983). The contributors' contexts and experiences also reflect a diversity of national, social, political and economic perspectives that enable readers to appreciate the work and circumstances of distance educators in other nations. The practices of distance education have become infused into "mainstream" education over the past two decades (see, for example, Smith and Kelly, 1987; Evans and Nation, 2000; 2003); however, this handbook re-draws the boundary around distance education in order that its substance, theories and practices can be recognized and appreciated as distinct and important ways in which nations educate their citizens.
REFERENCES


