ATHABASCA UNIVERSITY

HAROLD INNIS' NOTION OF TIME AND SPACE: A CONTENT ANALYSIS OF THE DISTANCE EDUCATION LITERATURE

BY

JAMES DUNCAN MACKINTOSH

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULLFILLMENT OF THE REQUIREMENT FOR THE
DEGREE OF DOCTOR OF EDUCATION

CENTRE FOR DISTANCE EDUCATION
ATHABASCA UNIVERSITY
FEBRUARY 2017

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Athabasca University
FACULTY OF GRADUATE STUDIES

Approval of Thesis

The undersigned certify that they have read the thesis entitled

"Harold Innis' notion of time and space:

A content analysis of the distance education literature"

Submitted by

James Mackintosh

In partial fulfillment of the requirements for the degree of

Doctor of Education in Distance Education

The thesis examination committee certifies that the thesis

and the oral examination is approved

Supervisor:

Dr. Dianne Conrad

Athabasca University

Committee Members:

Dr. Debra Hoven

Athabasca University

Dr. Evelyn Ellerman

Athabasca University

External Examiner:

Dr. David Black

Royal Roads University

March 13, 2017

Dedication

To the memory of my mother, Kathleen (1923-2013), who, like Harold Innis, grew up on a farm in an oral tradition of storytelling.

Acknowledgements

I would like to thank my supervisor, Dr. Dianne Conrad, for her steady and unfailing guidance throughout this project. I would like to thank my committee, Dr. Evelyn Ellerman and Dr. Debra Hoven, for their most helpful assistance. I would like to thank my External Examiner, Dr. David Black, for his very comprehensive suggestions.

I would like to recognize with gratitude my colleagues and teachers in the first doctoral cohort at Athabasca University for their collaboration and dialogue.

I would like to thank my Aunt Helen and Uncle Doug for shelter from the storm in the writing of some of my dissertation.

I would like to thank Brian Mackintosh and Doug Moore for their techno-wizardry with hardware and software issues.

I would like to acknowledge Stanley Park and my bicycle for valuable reflective time.

Abstract

New technologies are rapidly changing our concepts of space and time. Through the theoretical framework of Canadian scholar Harold Innis' "bias of communication," this study uses content analysis to investigate how current distance education literature (as represented by five peer-reviewed journals over 15 years of publication) reflects evidence of a space-bias in distance education technology. An understanding of Innis' notion of time and space can inform distance education practice by proposing the use of more synchronicity and orality in the design of distance education learning materials.

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Chapter One: Introduction

> Innis taught us how to use the bias of culture and communication as an instrument of research. By directing attention to the bias or distorting power of the dominant imagery and technology of any culture, he showed us how to understand cultures.
>
> McLuhan, M. (1964). Introduction. In Innis, H.A., *The bias of communication* (pp.vii-xvi). Toronto and Buffalo: University of Toronto Press.

In Marshall McLuhan's introduction to Harold Adams Innis' *The Bias of Communication* (1964), he hints at the enormous influence of Innis' thought on his own. Not nearly as well known as McLuhan, Canadian scholar Innis nevertheless provides a theoretical framework in which to examine new interactive technologies in distance education.

Since Innis wrote about communication technology in the late 1940s and early 1950s, highly interactive communication networks of media have developed that promote dialogue between learners and within groups. These technologies are discussed in the following study in the context of Web-based learning, mobile learning, OER (Open Educational Resources) and MOOCs (Massive Open Online Courses). Innis (1964) maintained that the media of communication were central to the history of an organized society, and that changes in the *form* of media created drastic changes in the institutions, power structures, and cultural values of those societies. Particularly relevant to distance education, Innis claimed that each medium imparts a bias in terms of organization and control of information. This bias, expressed in terms of time and space, and explained further in the literature review chapter of this study, affects the patterns and forms of knowledge and social interaction. Innis (1964) maintained, "A medium of

communication has an important influence in the dissemination of knowledge over space and over time and it becomes necessary to study its characteristics in order to appraise its influence in its cultural setting" (p. 5).

New technologies are rapidly changing our notions of space and time. Network society configures time and space in radically new ways than in the past. Mobility suggests space, rather than time. GPS is an enabling tool to assist users to control space. Google mapmakers refer to themselves as geo-spatial engineers. Texting is significantly spatial and preferred by users to orality. Twitter is obsessed with the now, and thus, exhibits present-mindedness.

New technology configures time and space in network society just as we might expect that it is so in distance education. This study examines whether distance education technology, like technology in network society, is heavily biased towards space. The following section elaborates on the problem that guides this research study.

Statement of Problem

Today's technology in network society configures time and space in radically different ways than in the past. New media of communication in network society are heavily space-biased, which creates for Innis, "the problem of space," and is why he pleads for more attention paid to the bias of time. This study examines whether distance education technology too is biased towards space by investigating a selection of the distance education literature for evidence of the extent of space-bias and time-bias in the media. "Bias," in Innis' terms, does not mean what journalists would call a slanted view in the content in a newspaper but "bias" actually means the significant influence that the *form* of communication technology has on culture. Since network society and distance

education share many of the same technologies, we might then expect distance education technologies to share the same temporal and spatial dimensions and exhibit the same characteristics as technologies in network society. Castells (2011) defines network society as:

> the social structure that characterizes society in the early twenty-first century, a social structure around (but not determined by) digital networks of communication (p. 4)…a society whose social structure is made around networks activated by microelectronics-based, digitally processed information and communication technologies. (p. 24)

Research Question and Design

This study uses content analysis as the methodology to investigate a selection of the distance education literature for evidence of the amount of attention to space-biased media as opposed to time-biased media in distance education. Content analysis is an appropriate and powerful method of analysis that has been used successfully by researchers in the distance education literature (Berge & Mrozowski, 2001; Bernard, Abrami, Lou, Borokhovski, Wade, Wozney, Wallet, Fiset, & Huang, 2004; Koble & Bunker, 1997; Lee, Driscoll, & Nelson, 2004; Ritzhaupt, Stewart, Smith, & Barron, 2010; Zawacki-Richter, Backer, & Vogt, 2009; Zhao, Lei, Yan, & Tan, 2005).

Content analysis is a technique that identifies themes and trends in the data and measures the strength of relationships among concepts or the textual data. Terms that represent themes and trends, and the strength of relationships among concepts such as space-biased and time-biased media, are extracted from a review of the literature, described below.

This study examined a sample of distance education literature as represented by the articles and editorials, in five particular major peer-reviewed distance education journals published between the years 2000 and 2014, a 15-year time period that covers the beginnings of web-based learning to the present-day of mobile learning and MOOCs. The selected journals were *American Journal of Distance Education*, *Journal of Distance Education*, *Distance Education*, *Open Learning*, and *International Review of Research in Open and Distributed Learning*. These prestigious journals are the most cited in the field of distance education and together contain a solid representation of current distance education theory and practice (Zawacki-Richter, Backer, & Vogt, 2009).

The study addresses the following research question:

> To what extent does current distance education literature reflect a space-bias and time-bias in distance education technology as defined by Innis' ideas regarding communication, media, and culture and their relationships to time and space?

Significance of the Study

Research shows that practitioners in distance education do not make effective use of information and communication technologies that could enrich the experience of students, despite the availability of a plethora of these tools and resources (Conole, Dyke, Oliver, & Seale, 2004; Conole & Fil, 2005; Conole, Oliver, Falconer, Littlejohn, & Harvey, 2007).

Research also still tends to focus on particular case studies rather than the development of underpinning theories and approaches (Conole, 2004; Kanuka, 2008). A common criticism of distance education research is the lack of theoretical and methodological research (Kanuka, 2008; Saba, 2000). This dissertation argues that Innis'

communication theory is flexible and malleable enough to embrace burgeoning changes in distance education.

Further, an understanding of the configuration of space-biased and time-biased media in distance education would add to the store of knowledge available to distance education practitioners, and Innis' notion of the temporal and spatial dimensions of technology might inform distance education practice. A complex network of time-biased media and space-biased media has certain affordances that shape the connections within and between media networks and individuals. In distance education, the affordances of certain technologies allow learners to manage time and control space.

Much research in distance education, as this study confirmed, focuses on what technology *does*, and almost never discusses what technology *is* (Kanuka, 2008). By drawing our attention to the *form* that technology takes, Innis as a philosopher of technology makes a more nuanced and subtle discussion of technology itself than is normally found in distance education. As we shall see, Innis' philosophy of technology disavows the view that technology is instrumentalist and neutral.

Chapter One Summary

This chapter outlined the context and discussed the problem of space and a plea for time that concerns this study, and followed that with a discussion of the significance of the study. The chapter concluded with the presentation of the research question and proposed a content analysis methodology to examine a sample of distance education literature for evidence of a space-bias in technology. What follows in Chapter Two is a literature review that provides the theoretical underpinning of this study by examining, in

more detail, the application of Innis' bias of communication to new technologies in distance education, and concludes with a discussion of technological determinism, philosophy of technology, and a plea for time.

Chapter Two: Literature Review

This literature review presents an overview of time and space, examines Innis' bias of communication in more detail, elaborates on the context of how new technological networks reconfigure time and space, and finally, discusses monopolies of knowledge and present-mindedness as a consequence of a space-bias. This chapter concludes with a discussion of criticism sometimes leveled at Innis for alleged technological determinism, which actually serves to make even clearer how Innis conceives of media; this is followed by a discussion of Innis as a philosopher of technology and what, for Innis, is a plea for time.

Overview of Time and Space

Time-biased media influence cultural patterns over time. Often a time-biased medium such as clay, stone, and parchment, is difficult to move from place to place. Innis used the Egyptian Sphinx and Pyramids as examples of the time-biased media that promoted continuity and endured over time. Another example can be found in the Middle Ages in Europe which, being under the sway of Catholicism, used parchment as a dominant medium. Innis (1972) describes how the rise of the Roman Catholic church in the early Middle Ages was precipitated by a number of circumstances such as the use of the parchment codex by Christian monks, the stoppage of supplies of papyrus to the West as a result of the rise of Islam in the seventh century, the favorable ecological circumstances of Western Europe for the production of parchment, and the relatively low literacy rates among the general population (Deibert, 2007). These cultures were exceedingly time-biased (Innis, 1964). Innis claimed that time-biased media are significantly associated with the customary, the sacred, and the moral.

Stamps (1999) maintained, “For Innis, the West had begun with a temporal bias and had ended, in the modern age, with a spatial one” (p. 62). The Catholic Church was virtually the only literate body in Europe during most of the Middle Ages. Innis describes how the Church lost its absolute power and monopoly over time to competition from secularism, writing and later printing in vernacular languages, and space-biased media. Innis (1964) wrote,

> A monopoly over time stimulated competitive elements in the organization of space. The introduction of paper from China to Bagdad and to Cordova and to Italy and to France contributed to the development of cursive writing and to the organization of space in relation to the vernaculars…. Life could be organized legally and politically over vast territories. (as cited in Heyer, 2003, p. 67)

Innis (1964) considered speech to be a time-biased medium because it requires the relative stability of community over time. The oral tradition encouraged the passing down of ancestral knowledge such as poetry and proverbs that remained unchanged over countless generations. As Heyer (2003) put it, “For Innis, a time-bias may have characterized those ancient civilizations that used durable media for communications, but it was also an aspect of the oral tradition where it implied continuity with the past and a sense of tradition” (p. 64). Furthermore, orality provides important benefits for any age or culture, just not so called “pre-literate” ones (Watson, 2006).

For Innis, the significance of the oral tradition is not that it is heard but rather that it involves dialogue (Watson, 2006). In Innis’ time, orality was mostly restricted to a face-to-face context, this being before a dialogic capacity was added to the technological mix.

Innis' formative years on a farm just east of Otterville, Ontario (Heyer 2007), were thoroughly steeped in the oral traditions of rural life and the orientation of agricultural time dependent on patterns of seasonal change (Watson 2007). As Watson (2007) pointed out, growing up on a farm "allowed Innis to comprehend that human appreciation of such a fundamental thing as the passage of time was not absolute but would change according to the principles of organization of a society" (p. 46). Innis' heritage "was mediated by a devout Baptist upbringing" involving a deep oral tradition (Stamps 1999, p. 55).

Some remnants of the oral tradition, according to Innis, can be found in the universities, the common law, the court systems, churches, and Parliament, as these institutions are some of our most ancient and time-biased institutions (Noble, 1999). However, as co-principal in the 1947 Manitoba Royal Commission on Adult Education, Innis (1964) warned, "the traditions of the university in the Western world have centred around the direct oral method of instruction but these have been weakened by the impact of mechanization" (p. 209). Innis was appalled by the idea of the massification of education that he saw in the ideas of John Grierson, who designed and founded the National Film Board of Canada. Theal (1981) maintained that "Innis' reservations about adult education, in which Grierson considered himself deeply involved, centered precisely around the complicity, that he saw between the adult education movement and the massification of society with the attendant threats to the university" (p. 1). Both Innis and Grierson shared an experience with wartime propaganda and each recognized the great power of space-biased cinema, newspapers, and radio to thoroughly deceive an audience. Innis (1964) claims, "as modern developments in communication have made for greater realism they have made for greater possibilities of delusion" (p. 82).

A space-biased medium extends empire over space; it is easily moved from place to place, but does not endure over time. Ancient Rome is one of Innis' examples of a society extended in space. Thus, before the fall of the Roman Empire, the Romans extended their empire over great expanses of territory with the use of space-biased media such as paper and papyrus. For Innis, space-biased media were associated with militarism and the secular, continue to increase in abundance into our contemporary era, and are often associated with business. Menzies (1999) claimed that every new communication technology in the modern age has served "to extend the bias of space—that is, the control over space, militarily and administratively but especially commercially—by commoditizing it" (p. 323).

Innis (1964) saw space-biased print as the defining technology of modernity, a major contributing factor in extending a spatial bias into the twentieth century. He wrote, "Lack of interest in problems of duration in Western civilization suggests that the bias of paper and printing has persisted in a concern with space" (p. 76). It is important to note, however, that print was not the only factor. As Heyer (2003) pointed out, "[Innis] adds to the mix the role of the compass in the age of discovery, the telescope in opening up astronomical knowledge, and the role of mathematics and perspective in art and architecture" (p. 67). The social meaning of technology only becomes manifest in their use. As Murray (2000) claimed, "All technologies carry social meaning, reflecting values and practices" (p. 54).

Print is a space-biased medium that plays a significant role in contemporary distance education practice. Until the beginning of the 1970s and the advent of two-way telecommunication technologies, print and the mail system were the predominant

delivery media for distance education. Print remains a very important support medium for electronically-delivered distance education. Printed study guides, for example, are still a very important component of many online distance education programs (Bates, 1995; 2014b). Innis valorizes orality, perhaps as a way to offset the overwhelming dominance of a space-bias. Echoing Plato's condemnation of writing, Innis (1964) wrote, "The effects on history were evident in a recognition of the limitations of the written and the printed record" (p. 63). And further, this effect can prove harmful to learning. Innis (1964) wrote, "Concentration on learning implies a writing tradition and introduces monopolistic elements in culture which are followed by rigidities and involve lack of contact with the oral tradition and the vernacular" (p. 4).

An important concept in Innis' thought is the question of *balance*. All past civilizations have sought in various ways to manage time and control space. Innis' model or ideal type for an oral tradition was based on what he understood as the "Greek experience"; here which the culture of ancient Greece, at least for a time, achieved a balance between orality and literacy, between time-biased and space-biased media. Innis (1964) wrote that "the power of the oral tradition in Greece which checked the bias of a written medium supported a brief period of cultural activity such as has never been equaled" (p. 64). For Innis, a balance of time and space results in social stability. However, Watson (2006) noted that Innis did not exhibit any great nostalgia for Greek culture; rather, "he was concerned with the present and how to encourage and cultivate oral resistance to space-biased communications" (p. 408).

Innis (1964) noted how difficult balance is to achieve in societies with great disparity of power among members. Innis (1964) maintained, "The concern with specialization and

excess, making more and better mousetraps, precludes the possibility of understanding a preceding civilization concerned with balance and proportion" (p. 140). Rarely are biases of time and space balanced in any given society. However, according to Innis, increasing the difficulties of recognizing balance are the constant changes in technology. We live a technological culture in which the constant introduction and utilization of new technologies are a normal part of existence. Innis (1964) wrote,

> The character of the medium of communication tends to create a bias in civilization favourable to an overemphasis on the time concept or on the space concept and only at rare intervals are the biases offset by the influence of another medium of communication tends to create. (p. 64)

The Bias of Communication

Two essays in Innis' *The Bias of Communication* entitled "The Problem of Space" and "A Plea for Time" encapsulate the issue of bias of technology and illustrate Innis' own bias (in the sense of his personal opinion) which, he admitted, leans toward the oral tradition. He saw the oral tradition as inherently more flexible and humanistic than the written tradition. Innis considered the modern mass media version of the written tradition to be rigid and impersonal in comparison to the oral tradition. In his view, space-biased media such as print and broadcast technology were characterized by expansion, military force, nationalism, commercialism, specialization, and mechanization. By contrast, Innis (1964) noted,

> The oral discussion inherently involves personal contact and a consideration of the feelings of others, and it is in sharp contrast with the cruelty of mechanized

> communication and the tendencies which we have come to note in the modern world. (p. 191)

Innis' view of the oral tradition is a very romantic one, according to Havelock (1982), and not borne out by the history (Heyer, 2003). Further, the amount of research to support Innis' perspective on the oral tradition was rather slight compared to his ample and prodigious research on the Canadian Pacific Railway (1923), fur trade (1927), and cod fisheries (1940). Innis' oral tradition was never supported by a rigorous theoretical analysis (Wernick, 1999).

Still, both heavily space-biased and time-biased cultures can produce monopolies of knowledge. Innis acknowledged that "time-biased civilizations also feature hierarchical social orders that allow an elite group, such as Babylonian priests or the Catholic clergy of the Middle Ages, to form a powerful class with exclusive access to monopolies of knowledge" (Heyer, 2003, p. 62). As mentioned, for Innis, the last bastions of the oral tradition were the universities, the law courts, and Parliament, but these institutions have long been implicated with space-biased media such as paper, print, and books. As Theall (1981) wrote,

> Since the oral tradition, which was fundamental to the historic university, has no longer been able to counteract the overwhelming influence of the book in spite of erecting more majestic, temple-like structures containing auditorium and lectures, it joined with the book in creating libraries and laboratories on an equally mammoth scale. (p. 12)

This would seem to be a semblance of balance but for its apparent increasing shift towards a space-bias in technology.

As community is increasingly seen as an important aspect of learning at a distance (Conrad, 2005; Rovai, 2002; Shackelford & Maxwell, 2012), so a time-biased medium such as speech to counter space-biased media is appropriate. Feenberg (2012) points to the importance of community, calling it "the primary scene of human communication and development" (p. 12). Innis associated a concern for time with religion, tradition, and community. For Innis, time is sacred; space is secular. Zhao (2007) wrote,

> In the oral culture, speech was the dominant medium. Knowledge was chanted and recited and stored in the collective memory. In such societies, knowledge was not monopolized; it was "multipolized" in the brains of every society member who shared the responsibility in maintaining and enriching the collective memory. Bound together by this shared memory, the oral people achieved a strong sense of time, tradition, community, and spirit. (p. 212)

Ong (1982) defined primary oral cultures as societies that exist with absolutely no contact with writing. Most oral societies developed special techniques for storing and transmitting knowledge. Since in these societies all knowledge has to be remembered, techniques to facilitate remembering are crucial. Some of these mnemonic devices include formulas, genealogies, rhythm, meter, repetition, and alliteration (Ong 1982); however, no primary oral cultures remain in the world today.

In *Orality and Literacy*, Ong (1982) coined the phrase "secondary orality" to describe a culture with "essentially a more deliberate and self-conscious orality, based

permanently on the use of writing and print" (p.136). Despite being just a few pages of description in *Orality and Literacy*, Ong's secondary orality has nevertheless had a great influence on theoretical discussions of new technology. For Ong, "the orality of telephones, radio, and television…depends on writing and print for its existence" (p. x). Secondary orality is the re-emergence and reshaping of an oral discourse within a literate culture. Secondary orality relies on affordances of print but also reintroduces the value of such oral features as community, group sense, and participation (Ong, 1982). These same technologies have migrated into distance education design and increasingly are consciously oral (Edouard, 2015; Ice et al., 2007; Ice et al., 2008).

Secondary oral cultures have been rendered significantly oral/aural once again by the appearance of electronic communication media, such as television, telephone, video and audio recording, computers, mobile phones, and other devices such as iPods. Wikis, texting, and Twitter are considered secondary orality and are purported to bear a resemblance to actual face-to-face or telephonic conversation (Ferris & Wilder, 2006). However, wikis, texting, and Twitter are concerned with the "now" and do not exhibit durability and continuity, which are important features of time-biased media. Ong's examples of secondary orality are telephones, radio, and television, which have a human voice component; social media such as wikis, texting, and Twitter generally do not have this affordance.

It is a question of emphasis. Ong (1967), in an earlier book, *The Presence of the Word*, stressed the interdependence of the senses rather than the sharp demarcation between orality and literacy articulated in his later work, *Orality and Literacy* (1982). This is in keeping with the notion that orality and literacy co-exist in varying proportions. Care

must be taken then not to sharply demarcate history into dichotomous pre-modern oral cultures and modern literate cultures. Smith (2007) maintained that,

> evidence we have from the social and cultural historians—as well as from some intellectual histories—regarding the senses for both modern and premodern periods suggests that we must be careful not to overstate the extent of the elevation of the eye following the print revolution and the Enlightenment, nor to understate the importance of vision to so-called premodern societies. (p. 17)

Finnegan (1988) too rejects the "polar typologies" of orality and literacy as simplifying and distorting the complexity of their actual use. She suggested that most cultures do not fit this typology.

> In practice a *mixture* (oral and written) is far more typical than a reliance on just one, with writing being used for some purposes, oral forms for others…. This kind of mixture is and has been a common and ordinary feature of cultures throughout the centuries rather than the "abnormal" case implied by the types model. (p. 141)

Orality and literacy can never exist ideally separate as theorized, but are the most valuable concepts to help us to understand their relative role in social practice. Finnegan (1988) suggested that studying the mixture would allow us to examine the ways orality and literacy interact, without omitting important aspects of either. She equated the invention of opposing models with the exercise of constructing "grand historical oppositions" between "civilized" and "primitive" cultures; such exercises probably say more about the Western view of the world than they do about the world itself. The situation is more complex than has been suggested in the past. Low (2001) maintained,

"Spoken word forms challenge some of the central tenets of theories of literacy and communication. They defy binary notions of orality and writing, words and music, voice and body, and standard and vernacular language forms" (p. iv).

The new distance education technologies such as smartphones are a rich mixture of time-biased media and space-biased media. The next section of this chapter looks in more detail at new technologies and connects them to Innis' notion of space-biased media and time-biased media. For example, Frost (2003) maintained that the Internet could emulate certain features of oral communication. A time-biased medium, such as speech, "can accommodate a flexible and multifaceted expression of ideas in a way few other media can adequately replicate" and sustain itself over time (Frost, 2003, p. 14).

The increasing audio and voice-capability of new technologies such as mobile devices in distance education increases the importance of looking to the oral tradition for some guidance, as discussed in the previous section. The following section examines the possibility of time-biased media offsetting to some extent the predominance of space-biased media among new technologies.

New technologies. The electronic medium to which Innis devoted some attention was radio, not television. (Innis died in 1952 just as TV was starting to make its presence felt in the living rooms of North America.) Illustrating a complexity and defying of fixed categorization is Innis' discussion of radio. While Innis only made some brief remarks about radio, his thoughts on radio still provide an illustration of the complex spatial and temporal dimensions that might be found in new technologies in distance education. Innis referred to radio as "a new medium" or "a new phase in communication." For Innis, radio

was a new oral, time-biased medium, which offset the space-bias of paper and print of newspapers, was concerned with continuity, and "involved an appeal to the ear rather than to the eye" (Innis, 1964, p. 188). At the same time, Innis viewed radio as a mechanization of the spoken word and part of the spatial bias of modern technology in the 20th century that included cinema and television. For Innis (1964), "the radio accentuated the importance of the ephemeral and of the superficial" and, like space-biased cinema and broadcast technologies, competed for attention in the entertainment and commercial realms (p. 82). Innis (1964) attributed many characteristics of space-biased media to radio, such as centralization and bureaucracy, and its ability to extend to great distances. Just as new technologies such as mobile devices and social media have brought profound changes to distance education, Innis wrote, "Shifts to new media of communication have been characterized by profound disturbances and the shift to radio has been no exception" (p. 188).

For Innis, the ultimate time-biased medium was speech. This study raises the possibility that among new technologies in distance education, there is a mixture of spaced-biased media with some time-biased media, in particular, using the affordances of the human voice. In their study, Ice, Swan, Kupczynski, and Richardson (2008) found that asynchronous audio feedback in an online course was associated with feelings of increased involvement and enhanced learning community interactions. Asynchronous and synchronous audio feedback represents a semblance of a time-bias. One important issue in understanding and evaluating knowledge construction in online collaborative learning is the notion of community, which can be either synchronous or asynchronous. Another investigation of audio feedback by Ice, Curtis, Phillips, and Wells (2007) found

an overwhelming student preference for asynchronous audio feedback as compared to traditional text-based feedback. The researchers also found, "The second most commonly expressed theme, increased feelings of involvement, is important because it reinforces the sense of community and perception of 'being there'"(p. 18). Cavanaugh and Song (2014), in a case study investigating students' and instructors' perceptions of audio feedback reported that students preferred audio feedback to written feedback, while instructors had mixed feelings about the use of audio. Specifically, audio feedback can be shown to be effective in distance education (Edouard, 2015) and preferred by students (Cavanaugh & Song, 2014).

The introduction of new technology into a culture was an important concern of Innis, which he referred to as a "cultural disturbance." In our current culture, one of the most significant characteristics of new technology these days is the idea of mobility. The burgeoning use of wireless, mobile, portable, and handheld devices is diversifying across every sector of education and society (Traxler, 2009). A good illustration of the vast array and complex mixture of these technologies is the web-like connections found in a network. Flew and Smith (2011) maintained that,

> The net result is an interesting combination of blurred lines (increased mobility for previously generic and non-mobile computing devices and increased capabilities on mobile devices like iPhones and Android devices) with sharp lines drawn by the addition of wireless Internet access to very specialized devices like home-audio equipment, e-book readers, cameras, bedside clocks, televisions, and a vast array of sensor devices. (p. 88)

It appears that new technologies are rapidly changing our notions of space and time in many different ways. Meyrowitz (1985) maintained in *No Sense of Place*, "Electronic media destroy the specialness of space and time" (p. 125). Kwan (2007) argued that the increasing use of mobile devices is "leading to fundamental changes in the spatial structure of connectivity and social networks" (p. 441). Turkle (2011) claimed,

> Our networked devices encourage a new notion of time because they promise that one can layer more activities onto it. Because you can text while doing something else, texting does not seem to take time but to give you time. (p. 164)

One significant characteristic of modern life is the perceptions of the accelerated pace of time, exacerbated by the increasing access speed to information, which Eriksen (2001) called "fast time" (as cited in Loureiro-Koechlin & Allan, 2010). "Slow time," on the other hand, is a temporal dimension that could be designed into a learning experience to give students time to reflect on the material and related activities to encourage the same.

Castells (2011) suggested that network society configures time and space in radically different ways, and further, maintained that there is a heavy space-bias in network society. In some ways, Castells is continuing along the same path where Innis left off. Castells maintained that the temporal and spatial dimensions of network society are made manifest in the form of "timeless time" and "space-of-flows." Timeless time promotes a sense that past and future converge in the present, in Castells' words, resulting in a disruption of our biological time as well as logical sequences of time. Network technologies are, according to Castells,

> in a relentless effort to annihilate time by negating sequencing: on one hand, by

> compressing time (as in split-second global financial transactions or the generalized practice of multitasking, squeezing more activity into a given time); on the other hand, by blurring the sequence of social practices, including past, present, and future in a random order, like in the electronic hypertext of Web 2.0, or the blurring of life-cycle patterns in both work and parenting. (p. 35)

Space-of-flows in network society allows for social life to proceed as if the locations are actually present and proximate, in Castells' terms, "social simultaneity without territorial contiguity." This refers to asynchronous interaction achieved at a distance. For Castells, the space-of-flows "dissolves time by dissolving the sequence of events and making them simultaneous in the communication networks, thus installing society in structural ephemerality: *being* cancels *becoming*" (p. 35). In Innis' notion of present-mindedness, the past and future dissolve into the present (Carey, 2004). Present-mindedness is discussed further later in this chapter.

The Internet as time-biased or space-biased? According to Frost (2004), the majority of technologies that make up the Internet are predominately space-biased, though some technologies have voice and audio capabilities. Zhao (2007), however, argues that some aspects of the Internet may be able to diminish the bias toward space that previously was embodied in traditional print and broadcast technology. According to Zhao, there are three aspects of the Internet that suggest that it has a significant time-bias. First, there is flexibility of time management. Time on the Internet ebbs and flows in a non-linear manner that is more in keeping with human experience. Zhao noted there is no such thing as "primetime" on the Internet as there is with a broadcast technology such as television.

Secondly, the Internet is conducive to the creation of online communities (Conrad, 2002; Rovai, 2002; Shackelford & Maxwell, 2012). According to Innis, the obsession of Western culture with space served to marginalize and trivialize religion, tradition, and community. Groups of this sort are now flourishing on the Internet. Social networking sites are prime vehicles for the formation of groups and communities in technologically enhanced contexts (Zhao, 2007).

Finally, facilitating a role in civic management is an important aspect of the Internet. The dialogic capacity of the Internet to facilitate political engagement is one of its most significant characteristics. The Internet is a site of citizenship (Dickin, Martin, Mitchell, Pannekoek, & Bernard, 2002).

Zhao (2007) noted that for Innis, a dialectical interaction, dependent on space-time dimensions within a particular medium and between coexisting media, exists between technologies and culture. Zhao (2007) wrote, "The influence of culture on media…is centrally reflected in a variety of social and historical contingencies, which may facilitate the emergence of certain media technologies and cultivate particular kinds of bias within those technologies" (p. 207). A number of such new technologies, as represented by such technologies as learning management systems, mobile devices, and social media, embody a mixture of space-biased and time-biased components, and exist within a larger media context.

The three elements relevant to the Internet, identified by Zhao (2007), can generally be found in web-based learning in distance education. These aspects lend support to the notion that at least some of the new distance technologies are time-biased. The three

elements identified by Zhao (2007)---flexible time management, online communities, dialogic capacity---are characteristics of time-biased media and, to some extent, exist in distance education technologies as represented by networks of learning management systems, mobile devices, and social media. Mobile devices are equipped with voice capabilities and learning management systems are beginning to incorporate audio into the design of courses (Edouard, 2015; Ice et al., 2008).

Networks of social media, learning management systems, and mobile devices are rapidly becoming common features of practice in distance education. Web 2.0 is an environment conducive to different forms of space-biased and time-biased media in distance education. O'Reilly (2005) defined it thus:

> Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences. (Web 2.0: Compact definition, para. 1)

Chesher (2009) suggested that "each Web 2.0 internet application configures space and time in its own way, arguably constituting a new medium in its own right" and, he further suggested, these applications are appropriate to be considered as media for analysis in Innis' framework. It is clear that these technologies exhibit a strong space-bias in a wide spread of network connections (Importing Innis into the digital society, para.

11). As Flew and Smith (2011) pointed out,

> The former dividing line between mobile and portable—a mobile being something you could use as you move around, and a portable being something you can move around and then use—is being broken down by a combination of ever-spreading wireless local area networking, via WiFi and the growing availability of mobile hotspots on planes, trains, and even automobiles. These hotspots gain Internet access through some other technology, such as satellite or wide area wireless (for example, WiMAX) or just the local 3G telephone data networks, then redistribute it via a local area network (LAN) that is wireless and mobile. (p. 88)

This section has discussed the possibility that among new technologies at least some media are time-biased. The next section discusses in more detail how present-mindedness can result from a strong space-bias of media and domination of time-biased media.

Present-mindedness. Present-mindedness is construed as an exaggerated concern for the present and a lack of attention paid to the past or the future. Innis (1964) wrote, "The modern obsession with `present-mindedness' . . . suggests that the balance between time and space has been seriously disturbed with disastrous consequences to Western civilization" (p. 76). In Innis' essay, "A Plea for Time," Havelock (1981) claimed that he "castigates the present-mindedness of our culture…our increasing inability as he saw it to grasp the importance of duration of time as opposed to extension in space" (as cited in Buxton & Acland, 1999, p. 5). According to Babe (2004), Innis used "present-mindedness" in order, "to indicate an exaggerated concern for the present, at the expense of a concern for or interest in the past or future, which is to say a lack of interest in matters of continuity or duration" (Harold Innis, para. 8). In our modern space-biased era,

it is Innis' plea for time that resonates. Innis was concerned with what he called in one essay, "the problem of space," and in another essay, he offered "a plea for time" in a disparate bid to offset the bias of space, to create a balance.

The pervasive neglect of time, what Innis called the "obsession with present-mindedness," is more deeply analytical and critical than his notion of space, although intimately connected. For Innis, space-biased media are relatively "light," and easily transported, and are not very durable. He analyzes space-biased media in a cool, calculating manner, but it is with some anguish, that Innis pleads for time. In the introduction to Innis' *Changing Concepts of Time,* Carey (2004) described Innis' thesis:

> The spatial bias of modern media, the attempt to extend lines of communication further and further, from center to margin, from capital to the hinterland, in order to exercise definitive control over the environment, including the humans that inhabit that environment, inevitably shrinks time down to the present, to a one-day world of the immediate and transitory. The future disappears into the present; everything changes at blinding speed, making it difficult to maintain continuity in time and culture. (p. xv)

Technology promises us the world, as Turkle (2011) maintained in *Alone Together*, "to let us do anything from anywhere with anyone.… [But] Our networked life allows us to hide from each other, even as we are tethered to each other"(p. 1). Turkle said we are now prone to being lonely everywhere in a relentless connection towards a new solitude. Turkle (2011) claimed, "Always on and (now) always with us, we tend the Net, and the Net teaches us to need it" (p. 154). We don't use technology so much as technology uses us (Norman, 2007). Innis saw a dramatic and destabilizing imbalance in the dominant

media of the mid-20th century in a bias towards space, and a neglect of time. Dislocation is at the heart of Innis' concern with the negative impact of digital communication technologies on community. Barney (2004) pointed to a number of studies (Hampton 2002a; Hampton, 2002b; Hampton & Wellman 2001) about a subdivision outside Toronto with the fictitious name of Netville, which was wired with a consortium of communication and network technologies; these studies offered "confirmation that community in North America has been progressively displaced into dislocated, individualized social networks and that digital communication and other technologies have contributed to the viability of this condition" (p. 57).

Characteristically, contemporary digital space-biased media such as some new technologies very often do not endure over time. Landfills are filling up with cell phones. Networks fail. As Flew and Smith (2011) pointed out, "Servers crash, infrastructure systems fail, and website access becomes overloaded and hence unavailable" (p. 117). Similarly, Chesher, in what has become quite common in network society, maintained,

> Internet web pages themselves have a limited lifetime. Site redesigns, closures, corruptions, broken links and crashes often degrade the contents of the web over time. Even services such as archive.org, Google Books and Wikipedia generate traces of the past that are constantly overwritten or compromised. (p. 14)

Monopolies of knowledge. Monopolies of knowledge entail the control of access to information or defining what constitutes valid knowledge. Monopolies of knowledge are found in space-biased media such as books and broadcast technologies, and are found only very rarely in oral cultures (Heyer, 2003). While time-biased cultures heavily favour oral communication, which can resist monopolies of knowledge, still, Heyer (2003)

notes, “their oral traditions are often constrained by a hierarchical and theocratic tradition in which elite groups control a monopoly of knowledge linked to writing” (p. 68). McGreal (2004) used the term “copyright controllers” to describe so-called “intellectual property owners” and vendors of music, videos, and books, and other forms of codified information. Much of the information on the Internet is open and freely available. Still, McGreal (2004) wrote, “Copyright controllers are trying to hold sway over our actions and create walled gardens around knowledge repositories so that they can maintain full control over who uses applications or accesses content and when, where, and how they use it” (Conclusion and Implications for Open and Distance Learning, para. 8).

Innis (1964) extended the economic concept of monopoly to include culture and political economy and, on a global scale; he identified monopolies of knowledge throughout history. He wrote, “Inventions in communication compel realignments in the monopoly or oligopoly of knowledge…. The relation of monopolies of knowledge to organized force is evident in the political and military histories” (p. 4). Monopolies of knowledge are not just a feature of the past, but can be found too in distance education. Conole and Dyke (2004) maintained, “There is a tension between the benefits of diversification and sharing of developments, a central ethos of the open source community with that of monopolization and co-modification, such as the dominance of particular software products to support office applications” (p. 120). Monopolies of knowledge are very much tied to Innis’ concern with “present-mindedness” and can have a deleterious impact on learning. Watson (2006) wrote, “The bias of the present is such that even the field of knowledge becomes imbued with a present-mindedness that emphasizes administrative technique and technical specialization” (p. 412).

Monopolies of knowledge have been built by some publishing firms in co-operation with departments of education and have been exploited by textbooks publishers. Zawacki-Richter, Anderson, and Tuncay (2010) pointed out,

> In the older `closed' publication model, a commercial publisher, university press or a professional association edits and publishes the journal and generates revenue from the sale of individual issues or articles, subscriptions or, more often today, by sale of aggregated databases of articles to libraries. (Literature review: Open access and closed access, para. 2)

On the Internet, a peer-reviewed journal article can cost US$25 with access limited to twenty-four hours. "Closed" distance education journals that limit access to information and knowledge or present difficulties in the way of access, would qualify in Innis' terms as monopolies of knowledge.

The view that monopolies of knowledge entail the control of access to information or define what constitutes valid knowledge is a conventional one that many Innis scholars adhere to and support (Heyer, 2003). There is a sense, however, that Innis hints at a broader view of monopolies of knowledge that encompasses communication, media, and culture more totally. Watson (2007) maintains that what is being monopolized in Innis' monopolies of knowledge is control over the structuring of space and time, which is beyond the context of distance education. The over-emphasis of a space-bias or time-bias can come to dominate a culture with "common sense" conceptions of space and time. Monopolies of knowledge ebb and flow between space-bias and time-bias as Innis (2007) describes: "Monopolies of knowledge had developed and declined partly in relation to the medium of communication on which they were built and tended to alternate as they

emphasized religion, decentralization, and time, and force, centralization, and space" (p. 192).

McLuhan was never interested in monopolies of knowledge per se but his perspective on technology was due in large part to his exposure to the works of Innis (Marchand, 1989). Still, Innis did not view various media as extensions of various senses as McLuhan did. Nor were there any suggestions in Innis that these media might distort human perception because they favoured one sense over another as McLuhan did. As Babe (2008) pointed out, McLuhan, in his writings, "longed for cosmic consciousness as opposed to contemplating oppressive monopolies of knowledge" (p. 14). While Innis focused on social organization, McLuhan (1967) was concerned with sense perceptions and the psychic effects of the media:

> All media are extensions of some human faculty – psychic or physical. The wheel is an extension of the foot, the book is an extension of the eye, clothing, an extension of the skin, electricity an extension of the central nervous system.
>
> Media, by altering the environment, evoke in us unique ratios of sense perceptions. The extension of any one sense alters the way we think and act---the way we perceive the world.
>
> When these ratios change, [humans] change. (pp. 26-41)

With the arrival of "electric technology," McLuhan (1964) maintained that, as gadget lovers, humans extended and set outside themselves a live model of the central nervous system. McLuhan claims that, in the Greek myth, Narcissus, part of the reason for a

numbing effect or *narcosis* is "the selection of a *single* sense for intense stimulus, or of a single extended, isolated, or 'autoamputated' sense in technology" (p. 53). In the myth, Narcissus became numb upon experiencing the disharmony between the believed self and the reflection he saw in a pool of water. According to McLuhan, the myth illustrates our growing relationship with technology that produces numbness in relation to the extensions that modify us producing a dissonance between perception and experience. McLuhan urges us to be aware of the impact of our totally embracing technological culture.

In another illuminating example, McLuhan invoked Edger Allan Poe's "A Descent into the Maelstrom" to illustrate how to survive in a situation faced by a sailor who got caught in a great storm and began to study its action as a means of survival. In the story, the sailor saves himself from drowning through detached observation of the vortex. McLuhan claims that we can free ourselves from the vortex of upheaval and social change by understanding it.

For Innis, the concern was how institutions in history seized upon various media of communication and used them to build up monopolies of knowledge. In the preface to *The Bias of Communication*, Innis (1964) mentions a question posed by his philosophy professor at McMaster University, James Ten Broeke: "Why do we attend to the things to which we attend?" (p. xvii). Innis answers with the "hope that consideration of the implications of other media to various civilizations may enable us to see more clearly the bias of our own" (p. 34). In what sounds a lot like what McLuhan might say, Innis reveals: "I have attempted to show that sudden extensions of communication are reflected in cultural disturbances" (p. 31).

Technological change

An element of Innis' theory that has had profound implications for the study of communication is the idea that change comes from the margins. Innis believed that those on the margins of empire, who were peripheral to the centre, invariably developed their own media. These media helped the periphery to develop and consolidate consensus and power. In a contemporary context, texting with cell phones is subversive for a technologically savvy generation and social media has become very powerful in the hands of previously disenfranchised groups. An important feature of new Web 2.0 technologies in networks is the way learners take control over the use and configuration of them (Dron, 2006; Dron, 2007; Siemens, 2005; Siemens, 2008). In distance education, this might translate into a more solid grounding in learner-centred approaches.

Examining recent sociological work on mobility, Farnsworth and Austrin (2008) suggested that social ties are initiated and maintained through hearing and conversation, regardless of whether these ties are face-to-face or at a distance. They argued, "conversation and hearing are at the heart of contemporary mobile societies precisely because they transcend the spatial and temporal limitations of seeing and visual technologies" (p. 233). In addition, Chesher (2009) pointed to the increasing improvement in the time-binding [time-biased] capabilities of digital media as accessible storage media, which endure over time, whether as archives or instant messages, as a characteristic of time-biased media.

So far this chapter has examined Innis' bias of communication in more detail, elaborated on the context of how new technological networks reconfigure time and space, and finally discussed present-mindedness and monopolies of knowledge as a

consequence of space-biased media. Before discussing the methodology of this study in the next chapter, it is important to discuss Innis' notion of time-biased and space-biased media in the context of the charge of technological determinism. In this way, Innis' notion of the bias of communication can be shown to be more complex and nuanced than one might otherwise imagine.

Technological determinism

Innis (1964) maintained that every medium could be classified as either time-biased (i.e., speech) or space-biased (i.e., printed word), suggesting that the media of communication were central to the history of an organized society, and that changes in the *form* of media created drastic changes in the institutions, power structures, and cultural values of those societies. Innis claimed that each medium imparts a bias of organization and control of information. In this view, the notion of "medium" is quite complex. As Heyer (2003) pointed out,

> A closer reading of Innis' argument…will reveal that when he employs the term "medium of communication," it usually does not mean only the raw material used—stone, clay, parchment, or paper—but also the *form* of communication embodied in that medium—hieroglyphics, cuneiform, or alphabetic writing. (p. 63)

Technological determinism is the view that technology is a key determinant of social and historical change, and it is a notion that is widely held (Pacey, 1983; Wyatt, 2008). Distance education is often couched in determinist terminology in the literature. As Anderson and Dron (2011) pointed out, "as we have seen in the case of the earlier

generations of distance learning, technology has played a major role in determining the potential pedagogies that may be employed" (p. 87).

According to Chandler (1995), technological determinism is attractive and has great explanatory and predictive power, although as a way of thinking and writing about technology, it is flawed. Winner (1977) maintained,

> Understood in its strongest sense, technological determinism stands or falls on two hypotheses: (1) that the technical base of a society is the fundamental condition affecting all patterns of social existence and (2) that changes in technology are the single most important source of change in society. (p.75)

Criticized for technological determinism, Innis is accused of considering technology as the significant determinant in social and historical change (Carey, 1967; Czitrom, 1982; Chandler, 1995; Curran, 2002; Shifman & Blondheim, 2007; Tremblay, 2012).

Space-biased media in general do dominate our contemporary network society but both Innis (1964) and Castells (2011) embrace a view of technology that is more complex than the mono-causal, reductionist model of technological determinism. According to Castells (1996),

> Technology does not determine society. Nor does society script the course of technological change, since many factors, including individual inventiveness and entrepreneurialism, intervene in the process of scientific discovery, technical innovation and social applications, so the final outcome depends on a complex pattern of interaction. (as cited in Howard, 2011, p. 18)

Watson (2006) maintained that to call Innis a determinist is to misrepresent his political position: “This kind of rigid determination calls up the image of a pessimistic anarchist railing against technological inevitability” (p. 320). Heyer (1981) would also disavow the criticism that Innis is a technological determinist:

> For Innis, communication technology never determines the character of an historical epoch; in his words it “hastens,” “facilitates,” or “helps to define” that character. Interplay, formation and interaction are terms that can be used to describe his view of the historical process. (p. 257)

For Innis, the processes of the interrelationship between society and technology are iterative and dialectical (Hissey, 1988). Heyer (1993) wrote that for Innis,

> History is perceived as a series of epochs separated by discontinuity, and these epochs are distinguished by dominant forms of media that absorb, record, and transform information into systems of knowledge consonant with the institutional power structure of the society in question. The interaction between media form and social reality creates biases, which strongly affect the society’s cultural orientation and values. (Context and direction in the work of H.A. Innis, para. 8)

Innis (1964) saw overemphasis upon time or space at the expense of the other as the principal cause of the dissolution of empires. Introduction of a new technology into society produces a discontinuity. Jhally (1993) wrote,

> the introduction of a new medium threatens the established relationships/patterns and provides a range of possibilities for new ones. The precise form of the new

> arrangements will depend upon specific history and the unique social, economic and cultural configurations on which it is acting. (An ecology of information, para. 8)

Christensen (1997) differentiated between sustaining and disruptive technologies. As Archer, Garrison, and Anderson, (1999) pointed out,

> In contrast to sustaining technologies, which improve the performance of established products, disruptive technologies often result in *worse product performance in the mainstream market*, at least in the short run, for example, a gravel truck unable to haul as big a load as existing models. (p.16)

However, to dismiss disruptive communication and learning technologies is often the reason for once successful organizations to fail and likewise places great pressure on institutions of higher learning. A balance between sustaining and disruptive technologies is as important as finding some balance between time-biased and space-biased media. Archer et al. (1999) claimed, "Attention to new, disruptive technologies should not preclude attention being paid to the sustaining technologies that will allow the central core of the institution to maintain its favourable position in the marketplace" (p. 24).

Another way to look at this tension is through Innis' dialectic of communications, which Watson (2006) maintains is between the poles of the "living tradition" and the "mechanized tradition," or concern between knowledge (oral and time-biased "living tradition") and power (written and spaced-biased "mechanized tradition"). While both Ong and McLuhan contrast orality with the written tradition, Innis makes orality contrastingly the opposite of mechanized communication. According to Watson (2006), the historical drift is not so much from time-biased media to space-biased media as it "is

away from living (or oral) communication and massively towards passive acceptance of mechanical messages" (p. 412). We can see this in the propensity these days to text messages rather than use the voice-enabled capabilities of smartphones (Turkle, 2015). This is not fixed, rigid, or determinate but extremely contextual. Watson (2006) wrote,

> Therefore, the ear and the eye, the auditory and the visual, the oral and written tradition, decentralization and centralization, time-binding and space-binding media, and religious and secular organization are not necessarily opposite poles of various levels of the same continuum. Their interrelationship does not follow any rule but is radically indeterminate, or, more correctly put, it depends on the various circumstances present in a particular historical context. (p. 411)

The context of this study is the spatial and temporal dimensions of new technologies in distance education. While there is some overlap of these categories, it is a combination of a number of characteristics that make it space-biased or time-biased media, along with the social and cultural practices of its use. So if a technology is time-biased in some respective context, it might still be to a larger extent space-biased. New technology in distance education is a rich mixture of time-biased and space-biased elements. This study investigated the possibility that any new "disruptive" time-biased technologies could mix with sustaining space-biased media to create a balance.

Technological determinism has long been a significant part of writing and thinking about technology. As Feenberg (1999) noted,

> After World War II, the humanities and social sciences were swept by a wave of technological determinism. If technology was not praised for modernizing us, it was

> blamed for the crisis of our culture. Whether interpreted in optimistic or pessimistic terms, determinism appeared to offer a fundamental account of modernity as a unified phenomenon. (p. 294)

Since this time, determinism has been seriously discredited but not really replaced with an adequate accounting of technology. As Feenberg (1999) pointed out,

> This approach [technological determinism] has now been largely abandoned for a view that admits the possibility of significant "difference," i.e., cultural variety in the reception and appropriation of modernity. Yet the breakdown of simplistic determinism has not led to quite the flowering of research in philosophy of technology one might hope for. (p. 294)

Examining technological determinism is a good way to introduce the philosophy of technology to this research.

Philosophy of Technology

Technology looms large over the entire distance education enterprise. Distance education is intimately connected to technology, so it is surprising then that the discussion of technology in the distance education literature seldom concerns the philosophy of technology. More to the point, that literature almost never addresses what technology *is*, but rather almost always discusses what technology *can do*.

The inaugural issue of the *International Review of Research in Open and Distributed Learning* (IRRODL), launched in January 2000, took a snapshot of the theoretical basis of distance education practice to date. Garrison (2000) wrote about theoretical challenges

of distance education in the 21st century and the grounding of theory in the works of C.A. Wedemeyer, Otto Peters, Borje Holmberg, and Michael Moore. Wedemeyer's (1971) focus on teaching and learning, Peters' (1993) concern with an industrial production model, and Holmberg's (1989) "guided didactic conversation" are concerned with learning and its relationship with technology, but not about technology per se. Michael Moore's (1993) important pedagogical "transactional distance" theory was directed towards learner autonomy and independent study, but mentioned technology only incidentally (Garrison, 2000).

A decade later, Anderson and Dron (2011) outlined three generations of pedagogy that characterize distance education: cognitive-behaviourist, social constructivist, and connectivist pedagogy. These theories arose historically at certain times and continue to play a significant role in distance education practice (Bates, 2014b; Schneider, n.d.). At the same time, Anderson and Dron (2011) proposed a middle ground between pedagogically-determined approaches and technologically-determined approaches. Some theorists place great emphasis on pedagogy; others less frequently, as this study has discovered, focus on technology. For example, with regard to cellphones, Traxler (2007) maintained,

> Some advocates of mobile learning attempt to define and conceptualise it in terms of devices and technologies; other advocates define and conceptualise it in terms of the mobility of learners and the mobility of learning, and in terms of the learners' experience of learning with mobile devices. (p. 1)

Where there is a focus on technology, it often takes the following perspective in the

distance education literature. According to Anderson and Dron (2011),

> Given the requirement for distance education to be technologically-mediated in order to span the geographic and often temporal distance between learners, teachers, and institutions, it is common to think of development or generations of distance education in terms of the technology used to span these distances. (p. 81)

This determinist position can be seen in keeping with Innis' space-bias of technology, when the various generations are examined through the technology lens. Innis argued that most of the technologies in the 20th century are space-biased, which strongly suggests that the various generations of distance education technology can be demonstrated to be predominately space-biased. The first generation of distance education technology was characterized by postal correspondence. The second generation was defined by the mass media of television, radio, and film production. Third-generation distance education introduced interactive technologies such as web-based learning and learning management systems. Besides being concerned wholly with space, and exhibiting little regard for time, these perspectives represent a determinist position. As Kanuka (2008) pointed out,

> Although not often given the label of technological determinist, scholars who view technology as influencing our education systems in positive ways also hold the same assumption that technology determines our uses and impacts society, but in a beneficial way. In the area of e-learning, for example, Garrison and Anderson (2003) assert that educational technologies can transform the learning experiences in positive ways, resulting in increasing the quality of learning experiences. (p. 99)

Innis interrogates technology as a philosopher of technology would: ---he as a philosopher of technology draws our attention to the *form* that technology takes (Heyer, 2003). Innis makes for a more nuanced and subtle discussion of technology itself than is normally found in distance education, by examining the bias of technology, which as often stated here has a temporal and a spatial dimension. As Feenberg (1999) pointed out, "Substantivist philosophies of technology drew attention away from the practical question of what technology does to the hermeneutic question of what it means" (p. 301). In Innis' philosophy of technology, he proposes: "The danger that knowledge of the past may be neglected to the point that it ceases to serve the present and the future---perhaps an undue obsession with the immediate, support my concern about the disappearance of time" (1964, p. 61).

A Plea for Time

Highly perishable space-biased media with their global reach appear to dominate in our contemporary network society. Innis considered speech to be a time-biased medium because it requires the relative stability of community over time, an aspect of the oral tradition, which implies continuity with the past. Innis pleads for time, but space is just a problem. The pervasive neglect of time is more deeply analytical and critical than his notion of space, although intimately connected.

Innis (1964) claimed, "The pervasive character of the time concept makes it difficult to appreciate its nature" (p. 64). Innis' plea for time is really a plea for balance between "the concepts of space and time." However, Babe (2008) noted that this balance "is not one of harmony or stability. Rather, it is dynamic, ever shifting, wrought by struggle and tension, achieved through countervailing power or opposition" (p. 14). There is tension

between time and space as the space-bias identified by Innis in 20th century technology has been wrought by much political struggle. Indeed, according to Innis, a cultural disturbance resulting in an overabundance of the time concept or an overabundance of the space concept results in instability and conflict. For Innis, "The relative emphasis on time or space will imply a balance of significance to the culture in which it is embedded" (p. 33).

However, it is not a case of simply replacing space-biased media with more time-biased media, but rather striking a balance between them. With regard to instructional design that incorporates space-biased media and time-biased media, Smith (2001) pointed out,

> Linguists Tannen (1982a; 1982b) and Lakoff (1982) point out that features of written and oral language are intertwined (see also Nystrand 1986; Smith 1994). Tannen (1982a) notes that, on the oral/literate continuum, orality emphasizes interpersonal involvement between speaker/writer and audience, whereas literacy focuses on message content, with gradations along the continuum. (p. 56)

It is a plea for more attention paid to temporal dimensions of social life in the face of the denial and extreme neglect of time. Innis' notion of space-biased and time-biased media, biases of communication in the past, can inform the present technological context of social media, mobile learning, and MOOCs and OER.

Chapter Two Summary

For Innis, balance between time-biased and space-biased media is often very difficult to achieve. Highly perishable space-biased media with their global reach predominate our

network society, and tend toward present-mindedness, and have issues with monopolies of knowledge. However, this space-bias may be offset to some extent by time-biased media such as speech, audio, and sound technologies. This chapter maintained the possibility that mobility and voice-capable devices offer a mixture and complex array of space-biased media and time-biased media.

Flexible time management, online communities, and dialogic capacity were identified by Zhao (2007) with time-biased media and, to some extent, exist in the new technologies as represented by networks of web-based learning, mobile devices, and social media in distance education. In addition, Chesher (2009) identified a characteristic of time-bias in archives of accessible digital media that endure over time.

The following methodology chapter of this study describes content analysis as the research method chosen to examine a selection of the distance education literature for the extent of space-bias and time-bias in distance education technology.

Chapter Three: Methodology

This chapter begins with a reiteration of the research question followed by a discussion of the theoretical framework of this research. Content analysis is then described as mixed methods research that is used in this study to examine a selection of the distance education literature for evidence of a predominance of a space-bias in distance education technology. This chapter concludes with a discussion of trustworthiness, rigor, and quality.

Research Question

This study addressees the following research question:

> To what extent does current distance education literature reflect a space-bias and time-bias in distance education technology as defined by Innis' ideas regarding communication, media, and culture and their relationship to time and space?

Below are a number of important philosophical assumptions, which are then followed by a description of the design of this research study, which employed content analysis in order to respond to the research question.

Theoretical Framework: Ontology, Epistemology, and Axiology

Methodology is the process of research (Creswell, 2013), but it is crucial to outline some philosophical assumptions of this study before proceeding. Hitchcock and Hughes (1995) proposed: "ontological assumptions give rise to epistemological assumptions; these, in turn, give rise to methodological considerations; and these, in turn, give rise to issues of instrumentation and data collection" (as cited in Cohen et al., 2007, p. 5). Philosophical assumptions buttress this study with attention to ontology, epistemology,

and axiology.

Ontology literally means the study of being; but usually in contemporary political theory, it has come to mean underlying assumptions of social reality (Scruton, 1983). In the case of qualitative research such as this study, it draws on multiple realities. As Creswell (2013) pointed out, "Different researchers embrace different realities, as do the individuals being studied and the readers of a qualitative study" (p. 20). There were many perspectives represented in the distance education literature analyzed in the course of this study.

Epistemology concerns what counts as knowledge and how that is justified. Constructivism is a theory of knowledge that is appropriate for online learning (Swan 2005; Swan, Garrison, & Richardson 2009). For this study, constructivism, particularly social constructivism, is appropriate to lend epistemological support. In distance education, Anderson and Dron (2011) pointed out,

> Social-constructivist pedagogy acknowledges the social nature of knowledge and of its creation in the minds of individual learners. Teachers do not merely transmit knowledge to be passively consumed by learners; rather, each learner constructs means by which new knowledge is both created and integrated with existing knowledge. (p. 84)

Social constructivists regard individuals and social society as interconnected (Woo & Reeves, 2007). Social constructivism is the active construction of knowledge based on experience with and previous knowledge of the physical and social worlds. The author of this study took a constructivist approach constructing knowledge from ample experience in distance education and communication. Further, Innis is a social constructivist

(Blondheim, 2004). Although proposing the primacy technology, as a social constructivist, Innis emphasizes the influence of human culture and the sociocultural context. As Blondheim (2004) pointed out, Innis "emerges as a through and through social constructivist, holding that technological change is engineered and affected by society's strategies and choices" (The Accepted Innis, para. 21).

Axiology involves the role of values in research, which can be moral and aesthetic. As Creswell (2013) put it, "In a qualitative study, the inquirers admit the value-laden nature of the study and actively report their values and biases as well as the value-laden nature of information gathered from the field" (p. 20). Innis admits a bias towards the oral tradition, as does the author of this study.

Content Analysis

This study examined the distance education literature as represented by five peer-reviewed distance education journals over the course of 15 years of publication from 2000-2014. There have been a number of studies of this type done using content analysis or meta-analysis on these same journals (Bernard, Abrami, Lou, Borokhovski, Wade, Wozney, Wallet, Fiset, & Huang, 2004; Berge & Mrozowski, 2001; Koble & Bunker, 1997; Lee, Driscoll, & Nelson, 2004; Ritzhaupt, Stewart, Smith, & Barron, 2010; Rourke & Szabo, 2002; Zawacki-Richter, Backer, & Vogt, 2009; Zhao, Lei, Yan, & Tan, 2005). These studies proved valuable to add support to the appropriateness and legitimacy of content analysis as a methodology for this study.

Content analysis is an effective method to analyze the data from distance education literature and also a popular method for analyzing transcripts from computer conferences (Rourke, Anderson, Garrison, & Archer, 2001). Content analysis has provided a valuable

method to examine a particular body of literature such as peer-reviewed journals. Uzuaboylu, Eris, and Ozcinar (2011) claimed, “Content and citation analysis in refereed academic journals has been conducted in a variety of professional fields, including psychology, geography, science education, and industrial technology” (p. 527).

Content analysis breaks down text into measurable units, undertakes a statistical analysis of these units, and then reports the analysis in some economical form. Anderson and Arsenault (1998) succinctly point out that, “at its simplest level, content analysis involves counting concepts, words or occurrences in documents and reporting them in tabular form” (p. 102). As well, content analysis can examine both manifest content and latent content. In a classic definition, Berelson (1952) defined content analysis as "a research technique for the objective, systematic, and quantitative description of manifest content of communications" (p. 74). Graneheim and Lundman (2003) pointed out, “over time, it has expanded to also include interpretations of latent content” (p. 105). Content analysis not only reduces and interrogates text into summary form so as to interrogate it, but as Cohen, Manion, and Morrison (2007) maintained, content analysis also features, “…examination of the interconnectedness of units of analysis (categories), the emergent nature of themes and the testing, development and generation of theory” (p. 476).

This study uses mixed methods research involving quantifying the number of times a concept appears in the literature and then qualitatively analyzing this data. Johnson, Onwuegbuzie, and Turner (2007) maintained that “Mixed methods research is an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or research paradigm (along with qualitative and quantitative research)” (p.129). As such, this study combined the quantitative counting and

measuring of keywords in the data with the qualitative interpretation of those results. There is much evidence that mixed methods research adds a richness to any research enterprise (Collins, Onwuegbuzie, & Sutton, 2006).

The following sections describe the sample and the methods of data analysis in this study, as well as provide a discussion of trustworthiness, rigor, and quality.

Sample. One of the major practical problems in content analysis is sampling. A primary consideration is how much information to preserve for analysis. One must be careful not to limit the results by doing so, but the researcher must also take special care not to take on so much that the coding process becomes too heavy and extensive to supply worthwhile results. Cohen et al. (2007) pointed out that "The key issues of sampling apply to the sampling of texts: representativeness, access, size of sample and generalizability of the results" (p. 477).

The sample of this study is drawn from a population of distance education journals from around the world, published in Spanish, French, and Chinese, as well as English; some are committed to open access, and some are not (Bates, 2008). The important issue of openness was investigated in Chapter Four of this study and discussed further in Chapter Five. This study constituted analysis of a sample of the articles and editorials in five peer-reviewed distance education journals published within the years from 2000 to 2014, and covering the early development of web-based learning to the present-day of mobile learning, OER, and MOOCs. The selected journals were *American Journal of Distance Education*, *Journal of Distance Education*, *Distance Education*, *Open Learning*, and the *International Review of Research in Open and Distributed Learning*. These prestigious journals included some of the oldest (*Distance Education* was first published

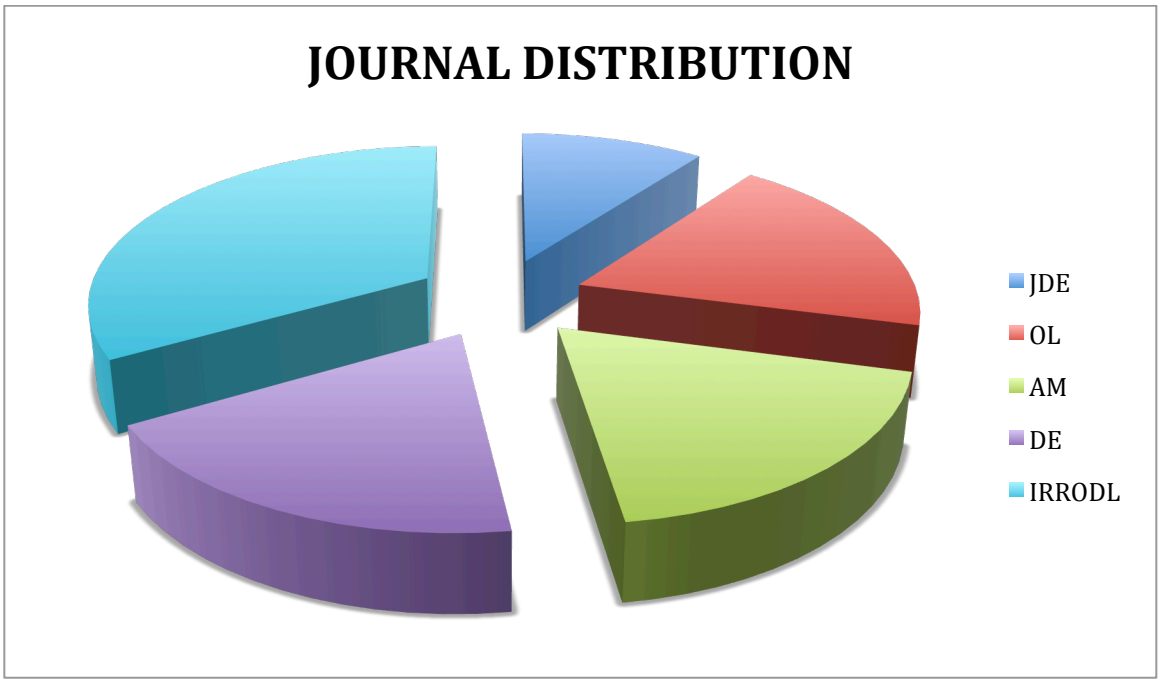
in 1980) and newest (*IRRODL* was first published in 2000), and all are highly respected in the field as well as together containing a solid and comprehensive representation of current distance education practice (Zawacki-Richter et al., 2009). These journals of research and scholarship generally aim to promote theory and best practices in distance education. These journals represent those most cited in the literature.

It should be noted that the Canadian *Journal of Distance Education* ceased publication for one year in 2013 and re-emerged in 1914 as the *International Journal of Distance Education*. The *Journal of Distance Education* (JDE) supplied the corpus with the 205 articles, the least number of all the journals, and the *International Review of Research in Open and Distributed Learning* (IRRODL) supplied 668 articles, the greatest number of articles. IRRODL publishes more issues per volume than all the other journals. *Open Learning* (OL) at 378 articles, *American Journal of Distance Education* (AM) at 374 articles, and *Distance Education* (DE) at 378 articles, supplied a similar number of articles to the corpus. The total sample, including all peer-reviewed articles, book reviews, and editorials, represented 2,003 units (N=2003), which were then analyzed.

Below are representations of the sample divided by journal in Figure 1, distribution of journals on the term *OER* in Figure 2, and distribution of journals on the term *MOOCs* in Figure 3.

Figure 1

The Representation of the Sample Divided by Journal

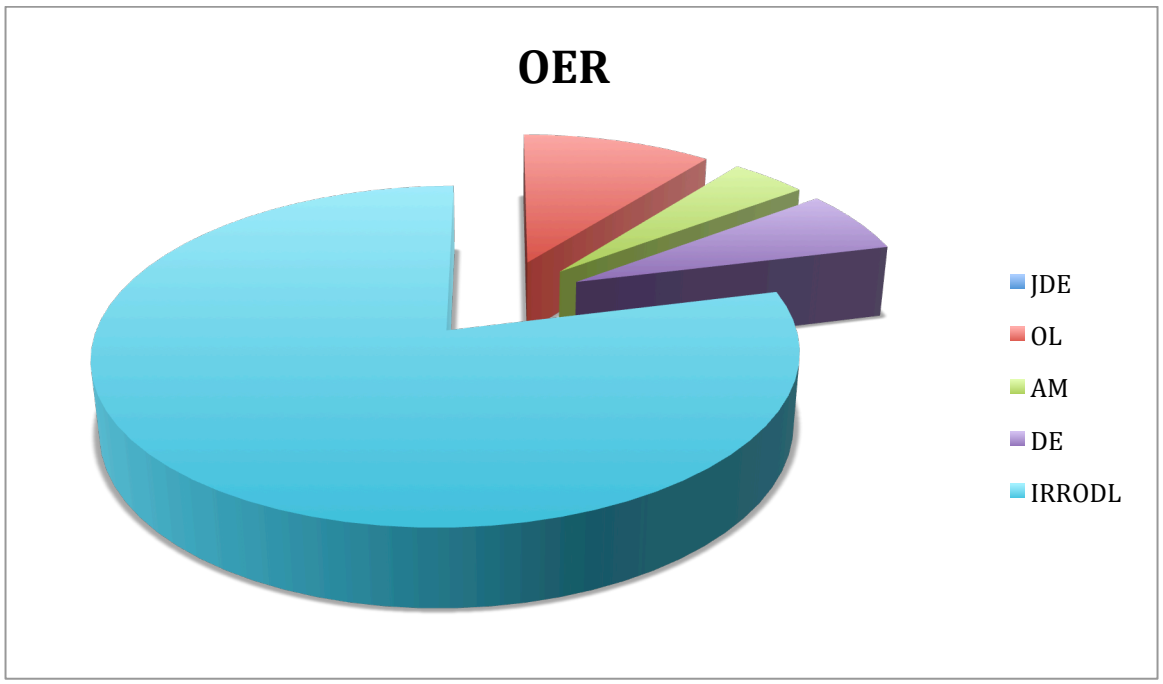


It is worth noting that in a survey of the articles in the corpus, word frequencies for *OER* in IRRODL outnumbered all the rest of the journals put together. This is at least due in part to IRRODL putting out three times more issues per volume than all others.

The following Figure 2 is a graphic representation of this difference.

Figure 2

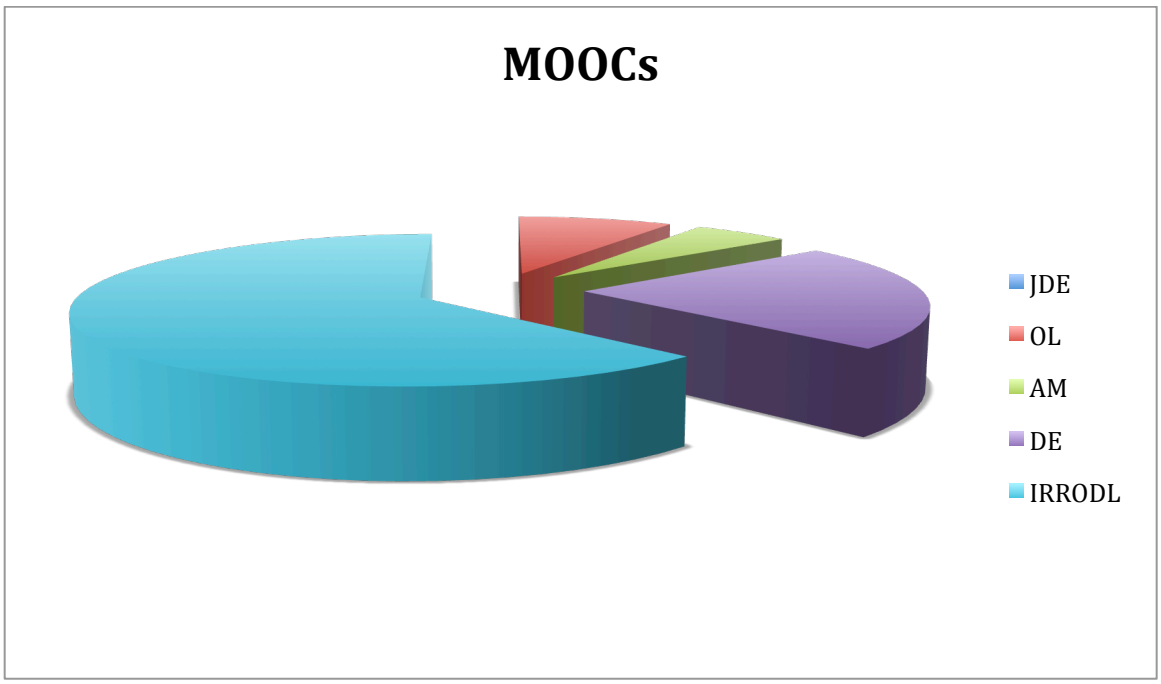
Representation of the Distribution of Journals on OER



As was the case with *OER*, references to *MOOCs* in the corpus turned up hits in IRRODL greater than all the rest of the journals combined. Below Figure 3 is a graphic representation of this difference.

Figure 3

Representation of the Distribution of Journals on MOOCs



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A note about language. Although Cohen et al. (2007, p. 476) defined text as written communication, text is viewed in a much broader perspective in communication theory. Movies are texts. TV shows are texts. Symphonies are texts. However, this study used *text*, along with *print* and *texting*, to represent Innis' space-bias. Also the content analysis of this study was completed on a text, which was represented in aggregate form by the distance education literature. In this study, content analysis discovers the trends and themes in the corpus, and uncovers the strength of the relationships between the trends and themes, that relate to the spatial and temporal dimensions of distance education technology. Although Innis concentrated in his work on orality and various modes of writing, he also considered beaver pelts and fish to be media of communication. Given

his wretched experiences in WWI, Innis might argue that guns and tanks with their veracious appetites for territory are space-biased; war monuments endure over time and are time-biased.

It must be noted that the language in the distance education literature was much different than the terminology used by Innis. For example, "space-biased media," as defined in the last chapter, is a phrase that was not to be found in articles in the distance education journals, even though there may be indeed a heavy space-bias in contemporary distance education technology. The phrase "monopolies of knowledge" was not to be found as such in the literature, but discussions of copyright, open media, and intellectual property may indicate its presence. As Tsatson (2009) pointed out, "'Time,' 'space,' and 'place' are some of the most used and misused terms in media and communications, and they have been defined differently and from different theoretical perspectives, constituting rather nebulous keywords in the field" (p. 12).

For Innis, changes in communication media have important implications that have profoundly influenced many societies and civilizations such as ancient Egypt as well as Western civilization. Poe (2011) proposed that Innis' vague and controversial term "civilization" be replaced with the more appropriate "media networks." Castells (2011) also identified a media network as a culture. Media with what Poe called "attributes" create particular media networks. According to Poe (2011), "Thus speaking creates speech networks, writing creates writing networks, printing creates print networks, electronic broadcast creates broadcast networks, and surfing (or any of the myriad things we do on networked computers) creates Internet networks" (p. 14). The term "affordances" is often used in place of attributes. Salomon (1993) outlined Gibson's

concept of affordances as follows: "'Affordance' refers to the perceived and actual properties of a thing, primarily those functional properties that determine just how the thing could possibly be used" (as cited in Conole & Dyke, 2004, p. 51).

In the content analysis process, coding is where a coder assigns whatever is being measured to one of the categories constructed and composed of affordances. For example, with the emergence of the Internet and other instantaneous digital communication media, there has been an exponential increase in the speed of information transmission. Speed/efficiency is a quality that may be deemed characteristic of a space-bias. "Progress" seems to apply almost exclusively to space-biased media. The extent of the use of space-biased media as opposed to time-biased media found in distance education practice was established by determining the amount of discussion of space-biased media compared to time-biased media.

While we cannot say with absolute certainty that the distance education literature is a simulacrum of distance education practice, there is nevertheless a strong correlation between the two. We assume that practitioners in distance education write about what they do.

The content analysis used clearly defined terms extracted from the literature review. For example, some terms suggested time-biased media: *dialogue*, *community*, *time*, *interaction*, *audio*, *archive*, *Internet, speech, history, open media, radio, durability, continuity, voice/smart phones,* etc. Some terms suggested space-biased media: *mobility, monopolies of knowledge*, *space*, *print*, *efficiency, speed, copyright, radio, intellectual property, broadcast, smartphones/texting*, etc. Note that radio is both space-biased and time-biased. Terms in both categories were differentiated on the basis of context. Content

analysis showed the strength of relationships, for example, between *monopolies of knowledge* and the spatial and temporal affordances of distance educational technologies. Analysis showed the connections between *community* and *dialogue* and space-biased and time-biased media. Data analysis followed the assignment of categories and coding activities. (Please see Appendix A for a list for keywords that were found in the distance education literature and represented Innis' terms: space-biased and time-biased media, monopolies of knowledge, and present-mindedness).

As Cohen et al. (2007) claimed that words and single codes have limited power, "it is important to move to associations between words and codes, i.e., to look at categories and relationship between categories" (p. 481). The categories used here were Innis' *time-biased media*, *space-biased media*, *monopolies of knowledge*, and *present-mindedness*; into these categories were put their attendant characteristics as represented by single word codes such as *voice*, *copyright*, *print*, *community*, *mobility*, and so on. Context is important to ensure the nuanced richness of specific words and connotations. Cohen et al. (2007) maintained that "Establishing relationships and linkages between the domains ensures that the data, their richness and `context groundedness' are retained"(p. 481).

Data analysis. Content analysis involves a number of processes that were applied to the corpus of this study:

- Word Frequency provides a list of all the words in the text and the number of times they occur.
- Co-word Analysis concerns the occurrence of pairs of words.
- Cluster Analysis places words and concepts into similar and dissimilar clusters.

The assumption here, in content analysis, is that the number of times a word, code, or category appeared in the data denoted significance in the analysis of text. In this study, content analysis quantified and analyzed the presence of words and concepts in the distance education literature from which inferences about distance education practice were drawn. This process involved tabulation of frequencies and percentages as well as correlation to identify the strength and direction of association between words, between codes, and between categories.

Frequencies of occurrence and co-occurrence were calculated, and then statistical analysis proceeded, utilizing such techniques as follows:

- *Tabulation:* of frequencies and percentages
- *Correlation:* to identify the strength and direction of association between words, between codes, and between categories
- *Graphical Representation:* for example to report the incidence of particular words, concepts, and categories over time or over texts. (Lowe, n. d.)

Analysis assumed that the number of times a word, code, or category appeared in the data was significant. This content analysis quantified and analyzed the presence of words and concepts in the distance education literature, and then made inferences about distance education practice. As Cohen et al. (2007) pointed out,

> Robson (1993: 401) suggests that drawing conclusions from qualitative data can be undertaken by counting, patterning (noting recurrent themes and patterns), clustering (of people, issues, events, etc. which have similar features), relating variables, building causal networks, and relating findings to theoretical frameworks. (p. 482)

And further, Cohen et al. (2007) claimed, "It requires the researcher, on the basis of the

evidence, to posit some explanations for the situation, some key elements and possibly their causes" (p. 483).

The overarching problem of content analysis is the challengeable nature of conclusions reached by its inferential procedures. Below is a discussion of trustworthiness, rigor, and quality.

Trustworthiness, rigor, and quality. Issues such as reliability, validity, and generalizability are discussed, often only briefly, in the methodology portion of many content analyses. The reliability of a study refers to its stability or the tendency of coders to consistently recode the same data in the same way over a period of time. In other words, reliability refers to the reproducibility or the tendency of a group of coders to classify category membership in the same way. Rourke et al. (2001) maintained,

> The reliability of a coding scheme can be viewed as a continuum, beginning with coder stability (one coder agreeing with herself over time), to interrater reliability (two or more coders agreeing with each other), and ultimately to replicability (the ability of multiple and distinct groups of researchers to apply a coding scheme reliably). (Replicability, para. 1)

The validity of a study refers to the correspondence of the categories to the conclusions, and the generalizability of results.

Many content analyses use Cohen's kappa, which is a statistic that assesses inter-rater reliability when observing or coding categorical variables. Cohen's kappa corrects for chance agreement and can be used for decisions between mutually exclusive categories. Generally, a kappa value of between .60 and .75 is considered good, and above .75 is considered excellent (Bakeman & Gottman, 1997, cited in Zawacki-Richter et al., 2009;

Fleiss, 1981). Validity and reliability issues were briefly addressed in Rourke and Szabo (2002) who report a value of 0.93 for one author coding all the items and the second author coding a 10% sample. However, Koble and Bunker (1997) provided the most detailed procedures for reliability and validity concerns when they employed outside raters to review a random sample of artifacts and determine topic classification. Inter-rater reliability was 0.71, which was low according to Koble and Bunker (1997) who indicated the low reliability "points to the difficulties in forcing articles into one main category" (p. 30).

Certainly, reliability and validity are fundamentally crucial to the positivist tradition, and are still quite common in qualitative research, but it is perhaps not necessary or appropriate to have interraters in a research study such as this one that is significantly more qualitative in nature than quantitative. For Armstrong, Gosling, Weinman, and Marteau (1997), reliability and validity "seem to have an uncertain place in the repertoire of the qualitative methodologist" (p. 597). Graneheim and Lundman (2004) pointed out, "a text always involves multiple meanings and there is always some degree of interpretation when approaching a text" (p. 106). And further, "reality can be interpreted in various ways and the understanding is dependent on subjective interpretation" (p.106).

As mentioned earlier, qualitative research takes a constructivist approach. Merriam (1995) noted, "Qualitative research assumes that reality is constructed, multidimensional, and ever-changing; there is no such thing as a single, immutable realty waiting to be observed and measured" (p. 54). Graneheim and Lundman (2004) offered a proviso: "There is no single correct meaning or universal application of research findings, but only the most probable meaning from a particular perspective. In qualitative research,

trustworthiness of interpretations deals with establishing arguments for the most probable interpretations" (p. 110).

Trustworthiness is a concept that has been proposed to replace reliability and validity throughout qualitative research. Issues of reliability and validity are most critical for ensuring rigor in a positivist paradigm; however, in qualitative research these notions are questionable and often couched in different terminology. Golafshani (2003) pointed out, "Reliability and validity are conceptualized as trustworthiness, rigor and quality in qualitative paradigm" (p. 604). Seale (1999), while establishing that some good quality studies exist through reliability and validity in qualitative research, stated that the "trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability" (p. 266). To ensure reliability in qualitative research, then examination of trustworthiness is crucial. And further, Granheim and Lundman (2004) claimed, "Research findings should be as trustworthy as possible and every research study must be evaluated in relation to the procedures used to generate the findings" (p. 109).

There are four criteria proposed to ensure trustworthiness: credibility, transferability, dependability, and confirmability (Guba, 1981). There have been some attempts to relate reliability and validity more directly to trustworthiness (Merriam, 1995). In a positivist paradigm, credibility corresponds to internal validity, according to Shenton (2004); that is, credibility seeks to ensure that the study measures what is intended. Further, transferability corresponds to external validity/generalisability, dependability corresponds to reliability, and confirmability corresponds to objectivity (Shenton, 2004).

Lincoln and Guba (1985) argued that ensuring credibility is one of the most important

factors in establishing trustworthiness (p. 7). In addressing credibility, investigators attempt to demonstrate that a true picture of the phenomenon under scrutiny is being presented. Credibility deals with the focus of the research and refers to confidence in how well data and processes of analysis address the intended focus (Polit & Hungler, 1999).

Another aspect of interpretation is that a text always involves multiple meanings and that, complicating the text's complexity further, the researcher's analysis is influenced by his or her personal history. Since the researcher is often the one who collects the data as well as the one who performs the analysis and writes a report of the findings, the question of the researcher's qualifications, training and experiences is important (Patton, 1990). Thus, credibility is tied to the credentials and experience of the author of the study. The author of this study, which involves a combination of distance education and communication theory, has a MEd in distance education and a MA in communication, and has worked as a tutor for 18 years in Communication Studies at Athabasca University, Canada's open university. Further, he has extensive research experience in both communication and distance education. This study represents an application of communication theory to distance education technology.

Morse, Barrett, Olson, and Spiers (2002) argued that the responsibility to ensure rigor should lie with the investigator and presents a case for the need to "enhance researchers' responsiveness to data and constantly remind researchers to be proactive, and take responsibility for rigor" (p. 15). Mays and Pope (1995) maintained that "the basic strategy to ensure rigour in qualitative research is systematic and self conscious research design, data collection, interpretation, and communication" (p. 110).

Trustworthiness also includes the question of transferability, which refers to "the

extent to which the findings can be transferred to other settings or groups" (Polit & Hungler, 1999, p. 717). Authors can give suggestions about transferability, but it is the reader's decision whether or not the findings are transferable to another context (Polit & Hungler, 1999). To facilitate transferability, it is necessary to give a clear and distinct description of culture, as well as the context of selection and the characteristics of data collection, and of the process of analysis. A rich and vigorous presentation of the findings together with appropriate quotations will also enhance transferability. Mays and Pope (1995) claimed that qualitative researchers should seek to achieve two goals:

> to create an account of method and data which can stand independently so that another trained researcher could analyze the same data in the same way and come to essentially the same conclusions; and to produce a plausible and coherent explanation of the phenomenon under scrutiny. (p. 110)

Another aspect of trustworthiness is dependability. The meeting of the dependability criterion is difficult in qualitative work, although researchers should at least strive to enable a future investigator to repeat the study. In addressing the issue of reliability, the positivist would employ techniques to show that, if the work were repeated, in the same context, with the same methods and with the same participants, similar results would be obtained. However, as Fidel (1993) and Marshall and Rossman (1999) noted, the changing nature of the phenomena scrutinized by qualitative researchers renders such provisions problematic in their work.

Lincoln and Guba (1985) stressed the close ties between credibility and dependability, arguing that, in practice, a demonstration of the former goes some distance in ensuring the latter (p. 63). According to Lincoln and Guba (1985, p. 299), dependability "seeks

means for taking into account both factors of instability and factors of phenomenal or design induced changes"; that is, dependability accounts for the degree to which data change over time and alterations made in the researcher's decisions during the analysis process. When data are extensive and the collection extends over time, there is a risk of inconsistency during data collection. In this study, the data was fixed at date of publication.

In order to address the dependability issue more directly, the processes within the study were reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results. Chapter Three of this study fully described in detail the steps taken in the design and implementation of analysis. Chapter Three attempts an in-depth scrutiny, which allows the reader to assess the extent, to which appropriate research practices have been followed. Shenton (2004) urged that researchers pay particular attention to "the operational detail of data gathering, addressing the minutiae of what was done in the field" and provide "reflective appraisal of the project, evaluating the effectiveness of the process of inquiry undertaken" (p. 72).

Finally, to achieve confirmability, researchers must take steps to demonstrate that findings emerge from the data and not their own predispositions. The collection of the data for this study, while labour-intensive and time-consuming, was not as much subject to human error as hand-coded data would likely be. Miles and Huberman (1994) considered that a key criterion for confirmability is the extent to which the researcher admits his or her own predispositions (p. 65). To this end, beliefs underpinning decisions made and methods adopted are acknowledged within the research report. In this study, the reasons for favouring this particular approach when others could have been taken are

explained and weaknesses in the techniques actually employed are admitted. The argument at the beginning of this chapter was the appropriateness and legitimacy of content analysis as a methodology for this study. This chapter ends with a discussion of the limitations and the difficulty of discussing culture from without or from within that culture, given the obstacles presented by a myriad of one's personal biases.

Delimitations and Limitations

Delimitation refers to the boundaries that are placed on the scope of the study by the researcher. The focus of this research was the later communication phase of Innis' work, not, for the most part, his early political economy phase, although some critics have maintained that there is much continuity between the two (Bonnett, 2001; Carey, 2004; Deibert, 2007). In addition, accessing the Innis archives at the University of Toronto was not possible due to the expense and time that it would require. To narrow the focus, the five journals that this study examined were based in the West, although a significant number of articles, and occasional special issues, were devoted to non-Western distance education contexts. Journals such as the *Turkish Journal of Distance Education* or the *Indian Journal of Open Learning* are excluded, but may be part of another study of further research with a wider scope.

The limitations in a study are those factors that are not under control of the researcher but may have possible effects on the study's outcomes. Innis (1964) pointed to the limitations and difficulty of discussing culture from without as well as from within that culture, allowing again for a myriad of one's personal biases. He maintained that

> We must all be aware of the extraordinary, perhaps insuperable difficulty in assessing the quality of a culture of which we are a part or of assessing the quality of a culture of

> which we are not a part. In using other cultures as mirrors in which we may see our own culture we are affected by the astigma of our own eyesight and the defects of the mirror, with the result that we are apt to see nothing in other cultures but the virtues of our own. (p. 132)

Chapter Three Summary

This chapter began with a reiteration of the research question that drives this study. Content analysis was then described as this study's methodology used to investigate the application of the communication theory of Harold Innis to distance education technology. Finally, the chapter concluded with a discussion of trustworthiness, rigor, and quality as well as the delimitations and limitations of this study.

Chapter Four: Analysis and Results describes the content analysis of the data, using Word Frequency, Co-word Analysis, and Cluster Analysis, and finally reports the results.

Chapter Four: Analysis and Results

This chapter details the various phases of the content analysis applied to the selected distance education literature, which begins with word frequency queries, and then continues with a sequential increasing refinement of co-word analysis and cluster analysis. The chapter concludes with a report of the results.

Use of Analysis Tools

The use of analysis tools allows the researcher to obtain outputs that represent significant relationships between the analysis units and enables the researcher to make inferences. The tools used in this study to evaluate different kinds of relationships between lexical units were word frequency, co-word analysis, and cluster analysis. Word frequency analysis provides a list of all the words that occur in a text and the number of times they occur. Co-word analysis uses patterns of co-occurrence of pairs of items (i.e., words or noun phrases) in a corpus of texts to identify the relationships among the ideas presented in these texts. It also is effective in mapping the strength of these relationships. Cluster analysis divides observations into homogeneous groups that are similar to one another with respect to variables or attributes of interest and distinct groups that stand apart from one another. Together these techniques form a strong strategy to capture some of the ideas of Harold Innis in the distance education literature that was selected for examination. Word frequency was performed with NVivo, a commercial software package designed for qualitative and mixed methods research. Co-word analysis and cluster analysis were performed by AntConc, a freeware concordance program developed by Prof. Lawrence Anthony, Director of the Centre for English Language Education, Waseda University (Japan).

Word Frequency

Word frequency queries list the most frequently occurring words in the text and, in this case, the most frequently used words in the corpus of selected distance education literature. (Please see Appendix B for the entire list) Lemmatization removes the grammatical structure from the surface form of a word, leaving only the stem; words are then counted as identical when they share a stem. The criteria for the word frequency query in this study included all the stemmed words in the corpus of distance education literature. For example, a lemmatizing frequency count would treat "education," "educating," "educator," and "educate" as the same word.

The five most frequent words returned in the query of the entire corpus were learn (122047, 1.63%), student (99515, 1.33%), education (98634, 1.32%), distance (62509, 0.84%), and online (58150, 0.78%), which capture the central concerns of the distance education literature examined in this study. Illustrating the significant relationship technology plays in distance education, technology was counted 30,187 times with a high weighted percentage of 0.40%.

Below is a Word Cloud (Figure 4) of the entire corpus. A larger font represents the more frequent words and a smaller font represents the less frequent words. The Word Cloud confirms that the most frequent word in the corpus is learning, followed by student, education, distance, and online.

Figure 4

Word Cloud of Entire Corpus

Along with *online*, other frequently cited terms were *interaction* (22938, 0.31%), *access* (14817, 0.20%), and *community* (14129, 0.19%). The terms *collaboration* (10307, 0.14%) and *web* (10275, 0.14%) were close together in frequency. The term *MOODLE* was counted 1039 (0.01%) times with *WebCT* (736, 0.01%) proving not quite as popular. The term *asynchronous* (4067, 0.05%) was more prevalent in the literature than the term *synchronous* (3047, 0.04%).

Words such as *print* (3498, 0.05%), *blended* (3385, 0.05%), and *writing* (3955, 0.05%) had a moderate rate of return.

The terms *open* (29563, 0.04%), *OER* (5925, 0.08%) and *MOOC*s (4692, 0.06%) were particularly prevalent in the last 2 years of the period examined in this study. Up until the end of 2012, *MOOC*s counted just 257 in a word frequency query of the corpus but in 2013 and 2014 the number of references to *MOOC*s increased substantially (4692). The term *copyright* (1660, 0.02%) was prominent in many of the discussions of *open* and *OER*.

The term *network* was counted 7707 (0.10%) times and the term *mobility* was cited in the literature 6347 times with a fairly high weighted percentage of 0.08%.

Broadcast technologies such as *radio* (1919, 0.03%) and *television* (1191, 0.02%) were cited much more than social media. Social media such as *Twitter* (404, 0.01%), *Skype* (175, 0.00%), *Wiki*s (1116, 0.01%), and *Facebook* (756, 0.01%) were only somewhat referenced in the distance education literature examined.

The term *Wikipedia* (249, 0.00%) and the term *library* (277, 0.00%) proved to be a fairly similar in the fairly even distribution of references.

The terms *audio* (2389, 0.03%) and *multimedia* (1942, 0.03%) produced a low rate of return. The terms *voice* (1266, 0.02%), *sound* (835, 0.01%), *podcasts* (539, 0.01%), *MP3* (142, 0.00%), *speech* (473, 0.01%) and *orality* (465, 0.01%) were at the bottom of the list of the word frequency query as were *soundscapes* (10, 0.00%) and *audiobooks* (2, 0.00%).

For the most part, these findings suggest a space-bias in distance education technology**.** Space-biased media such as print and broadcast technologies such as television and radio had a strong showing in the word frequency query. In sharp contrast to how many times the term *learn* was counted, time-biased media such as *voice* and *speech* were much less frequently counted at the bottom of the list as illustrated in Table 1 below.

Table 1

Word Frequency Query of Entire Corpus

WORD	COUNT	WEIGHTED PERCENTAGE
LEARN	122047	1.63%
AUDIO	2389	0.03%
MULTIMEDIA	1942	0.03%
VOICE	1266	0.02%
SOUND	835	0.01%
PODCASTS	539	0.01%
MP3	142	0.00%
SPEECH	473	0.01%
ORALITY	465	0.01%
SOUNDSCAPES	10	0.00%
AUDIOBOOKS	2	0.00%

The preceding word frequency query presented by Table 1 found an overwhelming under-representation of orality or the oral tradition in the literature studied.

The following section presents a co-word analysis that was then applied to the corpus.

Co-Word Analysis

Co-word analysis allows the researcher to find and map co-occurrence relationships between keywords, and is a technique that proved effective in mapping the strength of association between keywords obtained from the textual data. (Please see Appendix A for a list of keywords drawn upon in this study). Co-word analysis reveals patterns and trends in a specific discipline by measuring the association strengths of terms representative of relevant publications produced in a particular field (He, 1999).

The extent of the use of space-biased media as opposed to time-biased media found in distance education practice was established by determining co-words representing space-biased media and/or time-biased media, as was discussed in the sample section of the methodology chapter of this study. Co-word analysis has been effective in identifying trends and themes in the literature of the particular disciplines where it has been applied (Ritzhaupt et al., 2010), and is, thus, deemed appropriate to apply to the selected distance education literature in this study.

Co-word analysis concerns the occurrence of pairs of words. Co-word analysis is based on the theory that research fields can be characterized and analyzed based on patterns of keyword usage in a publication. Co-word analysis assumes that the keywords in a journal article constitute an adequate description of content.

The graphic visualizations below representing the co-word analysis of a number of keywords represent Rank and Total Frequency. The settings “FreqL” and “FreqR”

searched for collocates in a span of five words to the left and five words to the right of the keyword; and the default test statistic is MI, or Mutual Information. Mutual Information represents a ratio of the observed frequency (fo) of the combination of two words (or two word phrases) divided by the expected frequency (fe) of the combination: fo / fe. The expected frequency is the frequency supposing the combination was to occur by chance. The observed frequency is the actual number of times the two words co-occur in the corpus (Anthony, 2014).

The following analysis examines the co-words *asynchronous* and *synchronous* as represented by Table 2 and Table 3. In the previous word frequency, the keyword *asynchronous* proved more numerous than the keyword *synchronous*. The following co-word analysis looked more closely at the keywords *asynchronous* and *synchronous*.

Table 2

MI Collocates with "asynchronous" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
4	699	183	611	7.64953	Learning
6	414	147	267	7.92618	Online
8	314	18	296	9.72950	Discussion
9	313	218	95	12.26436	Synchronous
10	313	17	296	12.66565	Networks
13	228	34	194	9.40016	Communication
19	150	29	121	10.56611	Conferencing
20	129	30	99	9.95711	Text
32	89	44	45	7.86712	Interaction
54	52	11	41	9.07078	Mediated
58	50	14	36	7.08982	Web
60	48	6	42	7.76404	Internet
113	27	18	9	8.77957	CMC
134	23	14	9	7.14189	Collaborative
162	18	10	8	8.66133	Chat

Below in Table 3, as contrast to *asynchronous*, is the cluster analysis of the keyword *synchronous*.

Table 3

MI Collocates with "synchronous" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
4	313	95	218	12.26436	Asynchronous
8	139	49	90	7.23398	Online
9	138	16	122	9.55814	Communication
21	67	22	45	8.38332	Discussion
24	60	9	51	11.28064	Chat
25	59	19	40	8.15638	Interaction
33	47	11	36	9.55528	Collaboration
39	41	18	23	7.68587	Web
50	35	7	28	8.74122	Discussions
58	30	10	20	9.06922	Video
65	29	5	24	9.50822	Audio
71	25	12	13	8.47208	Text
104	15	6	9	10.35122	Videoconferencing
109	15	7	8	6.96831	Internet
121	14	4	10	8.71438	CMC

Co-words *asynchronous-online* and *synchronous-online* were both ranked very highly by frequency. Co-words *asynchronous-interaction*, *asynchronous-mediated*, *asynchronous-web*, and *asynchronous-Internet* shared similar rankings as co-words *synchronous-interaction*, *synchronous-collaboration*, and *synchronous-web*.

The terms *asynchronous* and *synchronous* were frequently clustered together in discussion. However, the preceding collates confirm that distance education technology

is asynchronous, text-based, and online. The co-word *asynchronous* was ranked much more highly with the co-word *text* than the keyword *synchronous* was. The co-word *chat* was ranked much more highly with the co-word *synchronous* than the co-word *text* was.

As indicated below in Table 4, co-words *collaboration-synchronous* had a much higher ranking than *collaboration-asynchronous*, which suggests that collaboration is more prevalent in synchronous learning environments than asynchronous learning environments.

Table 4

MI Collocates with "collaboration" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
8	204	90	114	5.90952	Learning
10	175	103	72	6.71025	Online
14	140	37	103	5.96578	Distance
17	127	80	47	8.58230	Communication
18	126	77	49	8.39502	Interaction
46	47	36	11	9.55528	Synchronous
62	39	18	21	6.47455	Design
66	37	24	13	6.67069	Discussion
85	30	18	12	10.96070	Cooperation
94	29	11	18	6.52000	Community
115	25	7	18	5.00589	Open
121	24	12	12	7.98166	Mediated
134	22	22	0	8.63927	Facilitate
168	18	12	6	7.61948	Dialogue
175	17	8	9	7.20581	Asynchronous

The following collates of *online* and *text-based* as represented by Table 5 and Table 6 below again confirm that distance education technology is asynchronous, text-based, and online. And again, the co-word relationship *online-asynchronous* is much more frequent than the co-word relationship *online-synchronous*.

Table 5

MI Collocates with "online" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
4	313	95	218	12.26436	Asynchronous
9	138	16	122	9.55814	Communication
11	120	30	90	5.99998	Learning
21	67	22	45	8.38332	Discussion
24	60	9	51	11.28064	Chat
25	59	19	40	8.15638	Interaction
33	47	11	36	9.55528	Collaboration
39	41	18	23	7.68587	Web
40	41	14	27	8.17989	Technologies
49	36	9	27	9.38957	Conferencing
51	34	17	17	9.94416	Synchronous
58	30	10	20	9.06922	Video
65	29	5	24	9.50822	Audio
71	25	12	13	8.47208	Text
104	15	6	9	10.35122	Videoconferencing

The co-words with *text-based* as illustrated in Table 6 that had the strongest relationship based on frequency were *asynchronous*, *conferencing*, and *online.* The co-words with *text-based* that had much weaker connections were *synchronous***,** *voice*, and *dialogue*.

Table 6

MI Collocates with "text-based" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
5	115	92	23	9.79137	Asynchronous
8	88	0	88	9.65061	Conferencing
10	84	21	63	5.47889	Online
11	72	13	59	7.59108	Communication
17	40	10	30	3.38655	Learning
26	27	4	23	6.04366	Discussion
34	20	17	3	7.45580	Video
35	20	2	18	6.35489	Internet
52	12	3	9	7.46353	CMC
56	11	8	3	7.28766	Synchronous
62	10	1	9	6.54610	Mediated
69	8	6	2	7.93216	Voice
75	8	3	5	4.24527	Interaction
87	7	6	1	8.141121	Listening
106	6	2	4	5.86205	Dialogue

The strong co-word relationship of *text-based* and *asynchronous* contrasts quite dramatically with the weaker co-word relationships between *text-based* and *voice*, *listening*, and *dialogue*, as indicated in Table 6 above.

Below Table 7 illustrates the co-word analysis that was then applied on the term *print*.

Table 7

MI Collocates with "print" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
2	837	92	745	9.07862	Online
5	686	58	628	9.89460	Open
13	138	16	122	9.55814	Learning
39	67	15	52	7.64891	Web
41	65	15	50	9.92711	Audio
56	49	12	37	9.03155	Video
79	33	13	20	9.45958	Radio
93	25	4	21	6.27594	WWW
97	23	7	16	9.40874	Television
105	21	15	6	7.85448	Reading
117	17	0	17	9.11175	Speaking
181	10	9	1	8.68523	Net
190	9	6	3	4.92929	Access
204	9	3	6	4.87404	Communication
218	8	2	6	7.57013	Multimedia

The co-words strongly associated with *print* as illustrated above in Table 7 have a mixture of co-words that are space-biased and time-biased and, further, are attached to a variety of other media: *audio*, *video*, *radio*, *television*, *reading*, and *speaking*. For Innis, print and radio are space-biased; speaking and radio are time-biased. Print, as discussed in the literature review of this study, is still a highly significant part of distance education

in course materials. Printed study guides, for example, are still a very important component of many online distance education programs (Bates, 1995, 2014b).

Orality or the oral tradition, similar to what was found in the word frequency query, was much less frequent in occurrence in the co-word analysis of the entire corpus. MI collates of *orality*, as shown below in Table 8, illustrate weak relationships between all co-words associated with orality such as *language*, *speech*, *interactivity*, and *discours*e

Table 8

MI Collocates with "orality" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
2	5	1	4	15.58559	Literacy
3	3	3	0	13.46108	Written
5	3	3	0	11.59358	Language
8	3	3	0	14.79657	Exploring
16	1	0	1	22.20030	Technologizing
17	1	1	0	14.41239	Speech
18	1	0	1	15.28143	Speaker
26	1	1	0	16.03037	Literate
27	1	0	1	18.49986	Linguists
28	1	0	1	13.03288	Involvement
29	1	0	1	12.99084	Interpersonal
30	1	1	0	12.74703	Interactivity
34	1	0	1	9.58536	Discussion
35	1	0	1	11.99572	Discourse
38	1	0	1	10.53718	Classroom

By any measure so far in this study, distance education technology was shown to be asynchronous, text-based, and online.

The following co-word analysis as illustrated in Table 10 and Table 11 examines more closely the terms *mobile* and *OER*, which are significant topics of discussion in the corpus of this study.

Mobile learning is made possible by the existence and application of mobile hardware and networking technology, so in Table 9 a co-word analysis was performed on *wireless* to discover the most frequent co-words associated with it.

Table 9

MI Collocates with "wireless" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
5	25	10	15	12.03583	Mobile
9	16	5	11	13.01352	Devices
10	14	3	11	9.96371	Technologies
11	14	4	10	10.20279	Internet
15	8	1	7	11.59199	Networks
16	8	2	6	5.42710	Learning
17	8	1	7	13.81497	Connectivity
24	6	2	4	13.083737	Satellite
25	6	2	4	8.27183	Access
28	5	2	3	13.63392	Ubiquitous
32	5	2	3	15.26618	Handheld
35	4	1	3	16.56574	WIFI
41	4	2	2	9.57706	Digital
42	4	2	2	7.88410	Data
46	3	1	2	7.247729	Web

The term *wireless* as indicated in Table 9 was heavily attached in a co-word relationship with *mobile*, *devices*, *Internet*, and *networks*. Below in Table 10 was a co-word analysis of *mobile.*

Table 10

MI Collocates with "mobile" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
2	906	172	734	8.11772	Learning
9	262	19	243	12.91420	Devices
14	161	9	152	13.41451	Phones
16	136	33	103	5.91285	Education
18	132	21	111	7.84105	Technology
24	103	39	64	8.24062	Access
25	95	29	66	5.46362	Distance
45	48	16	32	6.48823	Support
54	38	5	33	7.50562	Assessment
56	36	16	20	7.43261	Internet
57	36	14	22	9.54347	Applications
73	30	16	14	5.10296	Research
83	25	15	10	12.03583	Wireless
86	25	20	5	3.96010	Online
96	22	12	10	4.87873	Open

The term *mobile* had strong co-word relationships with *learning*, *access*, *online*, and *open*. The term *mobile* did not have any co-word relationships with *voice*, *listening*, or *dialogue* in this analysis, suggesting an under-utilization of time-biased affordances.

Below as illustrated in Table 11 was a co-word analysis of the term*, OER*.

Table 11

MI Collocates with "OER" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
11	207	147	65	7.86223	Open
14	169	140	29	9.03737	Resources
24	108	48	60	4.79869	Learning
25	106	8	98	11.95259	Movement
30	94	25	69	8.14544	Project
32	83	46	37	8.07150	Materials
48	53	33	20	6.38063	Support
56	46	19	27	6.82713	Access
59	45	21	24	8.56899	Policy
64	43	5	38	10.04236	Initiatives
70	40	18	22	11.30999	Sustainability
72	37	14	23	6.76647	Process
74	37	31	6	10.03705	Adoption
75	36	22	14	6.49822	WWW
79	35	11	24	5.07470	Research

OER was strongly associated with co-words such as *materials*, *support*, and *access*. The following collocates for *copyright*, *open*, and *access* as illustrated in Table 12, Table 12, and Table 13 respectively, more clearly indicated that OER are more space-biased than time-biased.

Table 12

MI Collocates with "copyright" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
3	399	235	164	8.04867	Education
4	353	202	151	7.94033	Distance
10	160	71	149	13.73007	Permission
11	159	1	158	14.61997	Holder
13	138	2	136	11.50082	Written
26	107	25	82	12.17486	Act
30	74	7	67	14.32602	Clearance
34	68	61	7	10.11482	Digital
42	52	22	30	11.76587	Property
44	48	7	41	8.00138	Issues
45	48	19	29	10.91558	Intellectual
49	39	13	26	7.81546	Materials
51	38	22	16	5.97590	University
54	34	13	21	7.22463	Access
61	28	10	18	8.71809	Policy

The term *copyright* is as illustrated in Table 12 above had a strong co-word relationship with *written*, *clearance*, *digital*, and *access***.** Below in Table 13 is an illustration of the co-word analysis of *open*.

Table 13

MI Collocates with "open" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
1	8250	1674	6576	8.46461	Learning
5	3611	665	2946	7.8702	Distance
6	3259	326	2933	8.97522	University
16	1034	825	209	6.49040	Online
21	686	628	58	9.89460	Print
32	489	398	94	6.29856	Research
54	313	56	257	7.00422	Access
56	304	227	77	6.20465	Technology
66	251	122	129	6.71047	WWW
80	216	37	179	8.44849	Flexible
89	203	113	90	5.30825	Teaching
90	203	169	34	5.72868	Support
98	183	27	156	7.79659	Press
111	138	70	68	6.81426	Book
135	115	9	106	9.85823	Textbooks

Co-words attached to *open* in strong relationships as illustrated in Table 13 were *print*, *press*, *book*, and *textbook*, which are strongly suggestive of a significant space-bias. The co-words strongly attached to *access* in Table 14 below were *learning*, *open*, and *equity*.

Table 14

MI Collocates with "access" in the Entire Corpus

Rank	Freq	FreqL	FreqR	MI	Collocate
16	613	439	174	6.42628	Students
20	475	263	212	9.44937	Internet
21	418	150	268	5.29661	Learning
26	313	257	56	7.00422	Open
28	282	49	233	8.32144	Resources
30	257	90	167	5.61683	Online
34	224	92	132	6.89890	Technology
35	223	47	176	6.96011	Information
39	204	105	99	4.86109	Distance
44	179	80	99	7.38004	Computer
55	141	48	93	11.25047	Equity
65	117	30	87	6.7222	Knowledge
67	109	41	68	5.96635	Support
71	103	64	39	8.24062	Mobile
76	97	51	46	6.42439	Web

In summary, the preceding co-word analysis found that the keywords *text* and *online* were strongly associated with the keyword *asynchronous* while the keyword *collaboration* was more strongly associated with *synchronous*. The term *text-based* had much weaker relationships with *synchronous*, *voice*, and *dialogue*. The term *mobile* was strongly associated with *learning*, *access*, *online*, and *open*, but had no co-word relationships with *voice*, *listening*, or *dialogue*. The term *orality* illustrated weak

relationships between all co-words associated with it such as *language*, ***s**peech*, *interactivity*, and *discourse*.

The following is a cluster analysis that was then applied to the entire corpus after the previous co-word analysis was complete.

Cluster Analysis

The objective of cluster analysis is to assign observations to groups so that observations within each group are similar to one another with respect to variables or attributes of interest, and the groups themselves stand apart from one another. In other words, the objective is to divide the observations into homogeneous and distinct groups. In contrast to the classification where each observation is known to belong to one of a number of groups and the objective is to predict the group to which a new observation belongs, cluster analysis seeks to discover the number and composition of the groups.

Below is a cluster analysis of the whole corpus of certain keywords such as *asynchronous*, *synchronous*, and *online*. The tables below represent rank (from most to less frequent strong clusters), frequency (the number of times the cluster appears in the corpus) and range (the number of files in which the terms appear).

This cluster analysis began with an indication shown in Table 15 that the term *asynchronous* was clustered around *learning*, *discussion*, *online*, and *communication*. Unlike the term *synchronous* illustrated in Table 16, *asynchronous* clusters strongly around *text*.

Table 15

Cluster Analysis with Keyword "asynchronous" of the Entire Corpus

CLUSTER	Rank	Frequency	Range
Learning	1	360	181
Discussion	2	219	86
Online	3	177	76
Communication	4	94	66
Text	5	77	54
Discussion	6	44	30
Conferencing	7	30	19
Distance	8	20	11
Interaction	9	20	17
Tools	10	20	10

In Table 16, the term *synchronous*, similarly to *asynchronous*, clusters around *communication*, *online*, *learning*, and *discussion*. However, unlike the term *asynchronous*, the term *synchronous* strongly clusters around *chat*, *collaboration*, *audio*, and *community*.

Table 16

Cluster Analysis with Keyword "synchronous" of the Entire Corpus

CLUSTER	Rank	Frequency	Range
Communication	2	69	34
Online	3	45	25
Learning	4	30	19
Chat	5	29	2
Collaboration	6	29	2
Discussion	7	29	16
Tools	8	29	9
Interaction	12	19	12
Audio	14	17	13
Community	18	11	9

The term *online* as illustrated in Table 17 strongly clustered around *learning*, *courses*, *education*, and *teaching*. The term *online* also clustered around *discussion*, *community*, *communication*, and *interaction*, all of which ranked highly.

Table 17

Cluster Analysis with Keyword "online" of the Entire Corpus

CLUSTER	Rank	Frequency	Range
Learning	1	3904	583
Courses	2	1577	348
Education	5	752	282
Teaching	6	677	192
Discussion	7	650	203
Distance	11	398	134
Community	14	331	90
Communication	18	233	90
Interaction	22	176	78
Technologies	30	130	56

In summary, the preceding cluster analysis of the whole corpus confirmed that the term *asynchronous* is strongly clustered around the space-biased term *text* whereas the term *synchronous* clustered around the time-biased terms *chat* and *audio*. Again, distance education was shown to be asynchronous, text-based, and online.

Some clusters around learning, distance, online, etc., are consistent throughout the whole time period studied in this corpus. However, other clusters around the transition to *web-based learning*, *mobile learning*, and *OER* and *MOOCs*, arose at specific times during the period represented by this corpus, which allowed for an historical, longitudinal evaluation.

The following cluster analysis of the corpus was divided into three time periods separated into transition to web-based learning, mobile learning, and OER and MOOCs.

Transition to web-based learning. Many of the journal articles in the early years from 2000 to 2004 in this study discussed the rapid change that various universities, colleges, high schools, and other educational institutions from around the world were experiencing as they transitioned from print-based to digital interface.

The keywords in the following analysis as illustrated in Table 18 and Table 19 were *web-based* and *face-to-face*, respectively. The strongest clusters reproduced in Table 18 below were *courses*, *instruction*, and *distance*.

Table 18

Cluster Analysis with Keyword "web-based"

CLUSTER	Rank	Frequency	Range
Courses	3	180	30
Instruction	4	146	46
Distance	5	119	37
Education	10	60	18
Training	11	49	13
Technology	15	32	5
Delivery	23	14	6
Video	26	14	2
Professional	30	12	3
Resources	36	10	7

In the early years represented by the corpus, many research projects describe a blending of face-to-face with online, or the benefits of entirely online learning. Table 19 below illustrates cluster relationships around *face-to-face*.

Table 19

Cluster Analysis with Keyword "face-to-face"

CLUSTER	Rank	Frequency	Range
Teaching	5	48	30
Interaction	6	47	27
Instruction	7	44	25
Classrooms	15	24	10
Learning	18	22	18
Education	19	19	16
communication	20	18	12
and online	35	9	6
Training	38	9	4
Technologies	40	8	6

The term *face-to-face* as shown in Table 19 was much less frequent than *web-based* and had somewhat weaker clusters around *interaction*, *communication*, and *discussion*.

The following is a cluster analysis of *mobile learning* in the next five-year period of the corpus.

Mobile learning. The first reference to *mobile* in the literature was in 2001; later,

there were two special issues dedicated to mobile learning in the *International Review of Research in Distributed and Open Learning*, (Ally, 2007), and *Distance Education*, (Traxler, 2010).

The keywords in the following cluster analysis as represented in Table 20, Table 21, Table 22, and Table 23, are *mobile*, *listening*, *speaking*, and *voice*, respectively.

Table 20

Cluster Analysis with Keyword "mobile"

CLUSTER	Rank	Frequency	Range
Learning	2	149	22
Project	3	72	12
Technologies	5	29	13
learning in nursing	6	28	3
Phones	7	23	13
Applications	15	6	1
Computing	26	4	4
Education	29	4	1
Internet	60	2	2
Involves minimal	63	2	1

The terms *learning devices* and *technologies* as represented in Table 20 rated highly clustered with *mobile*. There was no indication, however, of any strongly clustered relationship with *mobile* as a technology with some time-bias of *listening*, *speech*, or *voice*, as shown below in Table 21, Table 22, and Table 23. The term *mobile* was not found in the cluster analysis of *listening*, *speech*, or *voice*.

Table 21

Cluster Analysis with Keyword "listening"

CLUSTER	Rank	Frequency	Range
for silence	5	14	3
and speaking	7	9	9
to the podcasts	8	7	2
Skills	9	6	2
to the radio	18	3	3
and knowledge	35	2	1
and knowledge acquisition	36	2	1
Respectfulness	37	2	1
Activity	45	1	1
and affirmation	48	1	1

Below in Table 22 is a cluster analysis of *speaking*.

Table 22

Cluster Analysis with Keyword "speaking"

CLUSTER	Rank	Frequency	Range
Personally	2	44	18
Skills	7	10	7
and writing	10	4	3
Style	18	3	1
Reading	20	3	2
Activities	24	2	2
Students	49	2	1
the language	50	2	2
World	52	2	1
Oral	79	1	1

Below in Table 23 is a cluster analysis of *voice*.

Table 23

Cluster Analysis with Keyword "voice"

CLUSTER	Rank	Frequency	Range
Mail	5	7	5
-based	8	5	1
communication	9	4	4
over internet	12	4	4
Stories	15	4	4
Tools	21	3	2
Music	22	3	2
conferencing	26	2	1
music, flash	40	2	1
and speech	80	1	1

The terms *listening*, *speech*, and *voice* as represented in Tables 21, Table 22, and Table 23 did not have any strong cluster relationships with *mobile*.

The following is an examination of the clusters *OER* and *MOOCs* in the last five-year period of the corpus.

OER and MOOCs. Up until 2012, there was next to nothing mentioned about MOOCs in the literature, after which there was an explosion of articles on the topic.

The keywords in the following cluster analysis as illustrated by Table 24, Table 25, and Table 26 are *OER*, *open*, and *copyright*, respectively.

The term *OER* as illustrated below by Table 24 was very positively and strongly clustered around *Africa*, *development*, *project*, and *materials*. The term *OER* was also clustered with *repositories*, suggesting the time-binding capacity of archiving. For Innis, time-biased media endure over time.

Table 24

Cluster Analysis with Keyword "OER"

CLUSTER	Rank	Frequency	Range
Africa	2	68	8
Movement	6	46	16
Development	9	35	10
Project	10	35	11
Initiatives	12	29	11
Materials	22	15	9
Policy	38	10	2
Business	45	8	4
Repositories	49	8	6
Sustainability	50	8	3

The term *open*, as illustrated in the following Table 25, had strong clustered relationships with *learning*, *university*, and *access*. The term *open* was also strongly clustered with *educational resources*, *textbooks*, and *courseware*.

Table 25

Cluster Analysis with Keyword "open"

CLUSTER	Rank	Frequency	Range
Learning	1	981	124
University	2	564	132
Access	15	149	43
Education	17	97	27
Textbooks	18	89	6
educational resources	23	63	31
Source	25	55	28
Content	26	54	23
Courseware	27	49	21
Distance	42	26	10

The notion of *copyright* as illustrated in Table 26 below is serious business as it is strongly clustered around *law*, *protection*, and *infringement*. The term *copyright* is often contrasted with *open* in discussions in the literature.

Table 26

Cluster Analysis with Keyword "copyright"

CLUSTER	Rank	Frequency	Range
Holder	6	61	53
Act	29	44	5
Law	31	18	6
Issues	34	9	5
and access	35	8	2
Harmonization	38	6	4
Protection	39	6	2
access to knowledge	45	5	1
Clearance	46	5	4
Infringement	47	5	3

In summary, the preceding cluster analysis of the three time periods found that *asynchronous* clustered around *text* and *communication*. Neither *listening*, *speech*, nor *voice* showed a strong cluster with *mobile. OER* was clustered around *materials* and *repositories*. A certain tension was suggested in the cluster analysis of the corpus between *copyright* and *open*.

The following section reports the results of the analysis.

Results of the Analysis

Three types of analysis were applied to the corpus of five peer-reviewed journals published over the course of 15 years: word frequency, co-word analysis, and cluster analysis. These analyses were first done on the whole corpus followed by a cluster

analysis done on three separate time-periods. Some clusters around *learning*, *distance*, *online*, etc., were consistent throughout the whole time period of the corpus. Other clusters around the transition to Web-based learning, mobile learning, and OER and MOOCs, arose at specific times during the period represented by this corpus, which allowed for an historical, longitudinal evaluation.

Many of the journal articles in the early years from 2000 to 2004 in this study discussed the rapid change of transition from print-based to digital interface that various educational institutions from around the world were undergoing. The first reference to mobile learning in the literature was in 2001, and in later special issues on the topic (Ally, 2007) and (Traxler, 2010). Up until 2012, there was very little discussed in the literature about MOOCs (counted 257 times), after which there was an explosion of articles on the topic (counted 4692 times).

In the word frequency query, the five most frequent words returned were *learn*, *student*, *educator*, *distance*, and *online***,** which capture the essence of concerns within the distance education literature examined in this study. Illustrating the significant relationship technology plays in distance education, *technology* produced a high rate of return.

The term *asynchronous* was strongly associated with the space-biased *text*, whereas the term *synchronous* was strongly associated with the time-biased *chat* and *audio*. The term *collaboration* had a strong relationship with *synchronous*, and a weaker one with *asynchronous*.

The terms *audio* and *multimedia* produced a low rate of return. The terms *voice*, *sound*, *podcasts*, *MP3*, *speech*, and *orality* were at the bottom of the list of the word frequency query as were *soundscapes* and *audiobooks*.

For the most part, these findings suggest a space-bias in discussion about distance education technology**.** Web-based learning today is firmly set in an online, asynchronous, and text-based environment that is space-biased. It is important to remember that education in many places around the world, especially developing countries, are still primarily print-based (Bates, 2014b).

Issues such as cost comparisons between online and traditional classrooms (Jewett, 2000), student satisfaction in online environments versus traditional classrooms (Allen, Bourhis, Burrell, & Mabry, 2002; Kelsey, 2000; Swan, 2001), and time commitments by student and faculty in online environments compared to traditional classrooms (Bender, Wood, & Vredevoogd, 2004; DiBase, 2000; Visser, 2000), were all positively identified with web-based learning.

Clustered to this group were variables such as interaction (Kelsey, 2000; Lee & Gibson, 2003; Moore, 2000; Murphy & Coffin, 2003; Orrill, 2001; Roblyer & Wiencke, 2003; Winer, Chomienne, & Vázquez-Abad, 2000), asynchronicity (Bernard, Abrami, Lou, & Borokhovi, 2004; Bjo¨rck, 2002; Graham & Scarborough, 2001; Jewett, 2000; Kanuka, Collett, & Caswell, 2002; Neuhauser, 2002; Orrill, 2001; Painter, Coffin, & Hewings, 2003; Swan, 2001; Wertsch, 2002; Ziegahn, 2001), and performance where online learners did as well or better than traditional learners (Aragon, Johnson, & Shaik, 2002; Navarro & Shoemaker, 2000).

Co-word analysis confirmed that distance education is asynchronous, text-based, and online. Co-words *asynchronous-online* and *synchronous-online* were both ranked very highly by frequency. Co-words *asynchronous-interaction*, *asynchronous-mediated*, *asynchronous-web*, and *asynchronous-Internet* shared similar rankings as co-words *synchronous-interaction*, *synchronous-collaboration*, and *synchronous-web*. Co-word *asynchronous-text* is ranked much more highly than *synchronous-text*. Co-word *synchronous-chat* is also ranked much more highly than *synchronous-text*.

The co-words strongly associated with *print* have a mixture of co-words that are space-biased and time-biased and, further, attached to a variety of other media: *audio*, *video*, *radio*, *television*, *reading*, and *speaking*. Print is still a highly significant part of distance education technology. Bates (2007) points out, "Print is still the main form of distance education in many countries, even the British Open University, which does have online components, but is still primarily print-based and audio-based" (p.105).

Orality or the oral tradition registered very few hits in the entire corpus. MI collates of *orality* illustrated weak relationships between all co-words associated with it such as *language*, *speech*, *interactivity*, and *discourse*. By any measure so far in this study, distance education technology is asynchronous, text-based, online, and space-biased. Orality figures very low in terms of frequency in the word frequency, co-word analysis, and cluster analysis of the corpus.

Mobile learning is made possible by the existence and application of mobile hardware and networking technology. With cellphones having the technical capability of voice, the literature review chapter of this study discussed the possibility that mobile learning would have a mix of time-bias and space-bias. The term *mobile* has strong co-word

relationships with *learning*, *access*, *online*, and *open*. However, this analysis found that *mobile* had no strong co-word relationships with *voice*, *listening*, or *dialogue*. Neither *listening*, *speech*, nor *voice* showed a strong cluster relationship with *mobile*.

Clustered around *mobile* was increased access (Deimann & Farrow, 2013; Valk, Rashid, & Elder, 2010); mobile learning in Asia and Africa (Aderinoye, Ojokheta, & Olojede, 2007; Iqbal & Oureshi, 2012; Motlik, 2008); a lack of a strong theoretical basis and rigor in mobile learning (Park, 2011; Traxler, 2007; Valk, Rashid, & Elder, 2010); and unevenly spread around the world (Motlik, 2008).

The term *OER* was very positively and strongly clustered around Africa (Mtebe & Raisamo, 2014; Okonkwo, 2012; Sapire & Reed, 2011; Wright & Reju, 2012). OER was discussed for "their potential in expanding access and improving the quality of education, particularly in developing countries" (Kanwar, Kodhandaraman, & Umar, 2010, p. 65). OER were deemed important in resource-poor contexts such as Africa (Harley, 2011; Wright & Reju, 2012) and "may ultimately be the genuine equalizer for education and for empowering social inclusion in a pluralistic, multicultural, and imperfect world" (Olcott, Jr., 2012, p. 283).

The term *OER* was strongly clustered around social inclusion (Bossu, Bull, & Brown, 2012; Hodgkinson-Williams & Paskevicius, 2012; Nikoi & Armellini, 2012; Olcott Jr., 2012). A great deal of OER material was archived and clustered in *repositories* (Ally & Samaka, 2013; Friesen, 2009; Hodgkinson-Williams & Paskevicius, 2012; McGreal, 2014; Thakrar, Zinn, & Wolfenden, 2009), suggesting continuity and duration, which is an element of time-bias.

Despite the enormous volume of OER available, research has shown that the uptake of the use, reuse, revision, and remix of OER remains far from mainstream practice (Abeywardena, Tham, & Raviraja, 2012), (Hilton, III, & Wiley, 2012). As well, the barriers and limitations of the use and reuse of OER are not well-known (Amiel, 2013), and "while equity reasons often underpin the provision of OER, challenges continue to be experienced by some in assessing open digital materials for learning" (Willems & Bossu, 2012, p. 185).

MOOCs are a recent phenomenon and are growing fast (Brown, 2014; Moore, 2013). MOOCs represent a potentially exciting opportunity increasing access to education (Bell, 2011). MOOCs are an interesting development arising from the OER movement, but they may not all adhere to open licensing of content, open structure, and a collaborative community of learning. The term *MOOC* was strongly clustered around *interaction*, but in massive classes "the most widely used form of feedback is peer assessment" (Suen, 2014, p. 312), and "it is quite possible that a student will receive no customized feedback or meaningful interaction" (Dolan, 2014, p. 268). MOOCs fail to address the challenges of reaching students from disadvantaged backgrounds in developing countries (Kalman, 2014) and challenges still exist that include questionable course quality, high dropout rate, unavailable course credits, ineffective assessments, complex copyright, and limited hardware (Chen, 2014).

In conclusion, solid evidence in this chapter has revealed that distance education technology is asynchronous, text-based, and online. Through evaluation with word frequency, co-word analysis, and cluster analysis, results of this study have shown evidence of a heavy space-bias in distance education technology with an under-utilized

potential for orality in cellphones and a time-bias in OER archives. There was no evidence of an abundance of orality or the oral tradition in web-based learning, mobile learning, OER, or MOOCs.

Chapter Four Summary

In Chapter Four: Analysis and Results, the three analyses (word frequency, co-word analysis, and cluster analysis) were carried out on selected distance education literature and were described and reported on. In Chapter Five: Summary, Discussion, and Recommendations, a summary of the research is presented, and the conclusions that can be drawn from the data, questions arising from these, and suggestions of areas for future research are described.

Chapter Five: Summary, Discussion and Recommendations

This study investigated to what extent there is a space-bias and time-bias in distance education technology. This chapter provides a brief summary of the study, a discussion of this study's contributions to theory and distance education, and concludes with some recommendations and conclusions. This chapter returns to Innis' ideas and applies them to the results of the analysis in a discussion of the philosophy of technology, present-mindedness, monopolies of knowledge, and a plea for time, which for Innis is a balance between time-biased and space-biased media.

Summary

This study examined a selection of relevant distance education literature in order to determine the extent of space-bias and time-bias in technology. The problem of space, in the context of present-mindedness and monopolies of knowledge, is what concerns Innis, so he pleads for time, which is really a plea for balance between "the concepts of space and time" (1964, p. 64).

The texts on which analysis was done in this study comprised all the editorials and journal articles in five peer-reviewed distance education journals published over 15 years from 2000 to 2014 inclusive, covering a period from web-based leaning to OER and MOOCs: *American Journal of Distance Education*; *Journal of Distance Education*; *Distance Education*; *Open Learning*; and the *International Review of Research in Open and Distributed Learning*. These were downloaded from archived issues on the various publications' web sites through Athabasca University's library. These prestigious journals are the most cited in the field of distance education and together contain a solid

representation of current distance education practice (Zawacki-Richter, Backer, & Vogt, 2009).

Content analysis was used in this study to evaluate different kinds of relationships between lexical units, applying word frequency, co-word analysis, and cluster analysis to the corpus of distance education literature.

The following points were garnered from this research and will be discussed in more detail:

- Innis is a philosopher of technology. The philosophy of technology was not very prevalent in the corpus of literature that was examined in this study. The discussion of technology in the literature is mostly about what technology "can do," but almost never about what technology "is." This is somewhat surprising given the intimate relationship of distance education with technology.

- Through word frequency query, co-word analysis, and cluster analysis, distance education technology was found to be mostly asynchronous, text-based, and online, as well as space-biased.

- Mobility and mobile were shown to be a technical mixture of space-bias and time-bias, with time-biased capabilities severely underutilized.

- There was a lot of discussion of OER and MOOCs towards the end of the period of time examined in this study. In theory, OER and MOOCs break up Innis' monopolies of knowledge, but evidence of this was mixed.

- My recommendations argue for the inclusion of more synchronicity,

orality, and use of time-biased media in the design of distance education systems in order to enhance learning by connecting students to the social world outside academe, which includes orality and synchronicity.

Discussion

The following discussion, prompted by the results of the study, addresses the philosophy of technology, present-mindedness, monopolies of knowledge, and Innis' plea for time.

Philosophy of Technology

The philosophy of technology asks an important question: What *is* technology? According to Brey (2010), "It is an approach that refers to the need to 'open up the black box of technology' and reveal the diverse practices, processes, and artifacts that constitute technology" (p. 40). This approach tends to focus on exposing concrete practices. Innis' notion of the bias of communication is complex and nuanced, and is about what technology *is*, rather than what technology *can do*.

Innis' philosophy of technology disavows that technology is instrumentalist and neutral. Certainly, within the corpus of distance education literature studied, there was no discussion of what technology means and there was no discussion of the philosophy of technology. The only exception to this was Habermas, who was briefly mentioned in the pages of *Open Learning* (Evans & Nation, 2001; Jarvis, 2001; Sumner, 2001; Sumner, 2000). Classical philosophers of technology such as Heidegger and Jaspers, and contemporary philosophers of technology such as Latour, Borgmann, and Idhe, were entirely absent from the literature examined. For these philosophers, like Innis, a

technology is never simply an instrument, never a mere tool. The view that technology is a neutral vehicle that facilitates the delivery of educational materials to students is a prevailing one in distance education writing (Anderson & Dron, 2011), and one that is entirely congruent with a space-bias. The view that technology is neutral is seldom found in discussions of the philosophy of technology. As Verbeek (2005) pointed out, "Customarily, a philosophy of technology begins by emphasizing that technology is *not* neutral, noting that technologies do much more than simply achieve the goals for which they were instituted" (p. 43).

In Heidegger's (1977) essay entitled "The Question Concerning Technology," he sought to reveal "the essence" of technology. In *Technology and the Character of Contemporary Life,* Borgmann (1984), like Heidegger, discussed the limitations of the instrumentalist view of technology. Idhe (1990) maintained that the philosophy of technology could do two things:

> It can provide a perspective from which to view the terrain—in this case, the phenomenon of technology, or better, the phenomenon of human-technology relations. Second, a philosophy can provide a framework or "paradigm" for understanding. (p. 9)

Only Habermas was mentioned in the distance education literature examined in this study. Sumner (2000) maintained that Habermas' theory of communicative action, "as a powerful learning paradigm for diagnosing problems and envisioning cures, can respond to these calls for more critical and theoretical work, and be an effective tool for analysing historical developments" (p. 268). Further, Sumner (2000) wrote, "The history of distance education has been, by and large, more than a century of serving the system,

which strengthens its ability to colonise the lifeworld through privatisation, individualisation, rationalisation, militarisation and professionalization" (p. 281).

The commoditization of knowledge and the massification of distance education are concerns expressed by some. Innis believed that the massification of education was a threat to the university and the tradition of direct oral method in classroom instruction (Theal, 1981). Many contemporary MOOCs are commodified education, rather than the open education as promised by the acronym (Veletsianos & Kimmons, 2012). We have seen MOOCs move away from their original pedagogical and philosophical roots towards a market-driven enterprise (Ozturk, 2015). Similarly, Sariola, Sampson, Vuorinen, and Kynäslahti (2001) wondered if "the term 'm-learning' is a commercial trick to market technology and educational services or if it is something educationalists should take seriously" (p. 91). Distance education is implicated in the massification of higher education in two ways. Arinto (2007) claimed,

> First, DE – and the associated concepts of flexible learning and lifelong learning – is underpinned by social ideals of equality of opportunity and democratic participation…. Second, certain conceptions of DE are market-driven: it is touted as a cost-effective strategy for broadening the reach of education systems. (p. 4)

A market-driven approach to distance education can have unintended consequences. Feenberg (2012) pointed out,

> One complaint about online education is that it has largely been taken over by commercial software developers. This tends to mean universities are signing off on expensive licensing agreements and putting themselves at the whim of the companies who offer web-based educational services. (p. 62)

The following sections look more closely at the application to distance education of Innis' present-mindedness, monopolies of knowledge, and a plea for time.

Present-mindedness

Constant, relentless upgrading of software, across all sectors and significantly in distance education, demonstrates present-mindedness. Evangelical rhetoric is often part of statements concerning new technology (McLuhan & Fiore, 1967) and is often accompanied with present-mindedness. An example of contemporary present-mindedness, and a lack of interest in continuity or duration, can now be seen in the neglect of Ivy League colleges of the history and prior research done on MOOCs (Baggaley, 2014; Bates, 2014a).

MOOCs are an interesting development arising from the OER movement, but these days they may not all adhere to open licensing of content, open structure, and a collaborative community of learning (Rohs & Ganz, 2015). In the literature, MOOCs are divided into two quite different approaches: cMOOCs and xMOOCs. The pedagogy of cMOOCs is based on connectivism, which is the idea that learning happens within a network, where learners use digital platforms with elements of time-bias such as blogs, wikis, and social media to make connections with content, learning communities and other learners to create and construct knowledge. The teaching methods of xMOOCs are based on behaviourist pedagogy, relying primarily on information transmission, computer-marked exams, and peer assessments. While xMOOCs tend to be asynchronous and text-based, cMOOCs tend to be more balanced with some synchronicity and orality, and where social media are more prevalent.

The rise of corporate xMOOC ventures such as Coursera, edX and Udacity has caused distress in higher education. As Bates (2014a) pointed out, what precipitated their enormous current popularity were Ivy League institutions offering MOOCs while ignoring the pedagogy and prior research of Downes and Siemens (2008), and others. Stephen Downes considered cMOOCs to be more "creative and dynamic" than the current xMOOCs, which he believed "resemble television shows or digital textbooks" (Parr, 2013). Innis (1964) would claim that television and textbooks are space-biased; similarly, as he says, "the bias of paper and printing has persisted in a concern with space" (p. 76). Baggaley (2014) noted that the early widespread acceptance of MOOCs may be misplaced as witnessed by Harvard University's rejection of key MOOC principles and their replacement "by small private online courses, not obviously different from the online education offered by distance education institutions since the mid-90s" (p. 126). xMOOCs exhibit present-mindedness by ignoring prior research on MOOCs and not acknowledging prior experience. As Innis (1964) pointed out, "Obsession with present-mindedness precludes speculation in terms of duration and time" (p. 87). Thus, xMOOCs do not exhibit the continuity with the past that is so characteristic of time-biased media.

Representing "an inevitable challenge and transformative force," Feenberg (2012) pointed out, "The 'virtual university' stood as a technological destiny, a logical replacement for the cumbersome and anachronistic 'traditional' institution" (p. 44). MOOCs have been heralded with great fanfare. The explosive growth of MOOCs in the last couple of years was reflected in the attention it received in the distance education literature examined (five journals over 15 years) in this study. Up until 2012, there was

nary a mention (*MOOC*s counted just 257 in a word frequency query of the corpus); after that, there was an explosion of articles on MOOCs (in 2013 and 2014 the number of references to *MOOC*s increased substantially to 4692 times). In 2014, Dolan pointed out, "We seem to be compulsively obsessed with MOOCs" (p. 269). Turkle (2015) wrote, "If you tried to design an educational technology perfectly suited to the sensibilities of hyper attention, you might come up with MOOCs, or massive open online courses" (p. 227).

Internationally-renown distance educator, Tony Bates (2014a) blamed his retirement from "professional practice" on xMOOCs. In his blog, he wrote:

> I can't express adequately just how pissed off I am about MOOCs – not the concept, but all the hubris and nonsense that's been talked and written about them. At a personal level, it was as if 45 years of work was for nothing. All the research and study I and many others had done on what makes for successful learning online were totally ignored, with truly disastrous consequences in terms of effective learning for the vast majority of participants who took MOOCs from the Ivy League universities. Having ignored online learning for nearly 20 years, Stanford, MIT and Harvard had to re-invent online learning in their own image to maintain their perceived superiority in all things higher educational. And the media fell for it, hook, line and sinker.

Not only does the spatial bias of modern media shrink time down to present-mindedness, as identified by Innis, but the future also disappears into the present (Carey, 2004). A dramatic illustration of present-mindedness is the digital watch that metaphorically stands for much new technology. By eliminating the hands of the clock

and replacing them with a pulsating number, representation of the past and the future totally disappear. Rifkin (1989) wrote,

> By eliminating the circle, the digital watch helps eliminate the notion that time is cyclical and related to the larger rhythms of the earth and solar system. By displaying only the current time, the digital watch eliminates a reference point for observing where the time came from and where it is going. The past and future are nowhere to be seen. Only the present exists. (p. 121)

Still, in the following discussion of monopolies of knowledge, a time-biased characteristic of continuity and duration was identified in archived OER.

Monopolies of Knowledge

According to Innis (1964), monopolies of knowledge in ancient cultures such as Babylon and Egypt were dominated "by priestly organization and protected by complex types of script such as cuneiform and the hieroglyphic," which then "checked the growth of political organization" (p. 38). In modern times, Innis' monopolies of knowledge have been built by some publishing firms in co-operation with departments of education and have been exploited by textbook producers and protected by copyright. But at the same time, in theory, OER break up Innis' monopolies of knowledge. OER are open-licensed documents and media that are useful for teaching, learning, and research purposes. OER can be defined as

> ...teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others. Open educational resources include full courses, course

> materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials or techniques used to support access to knowledge. (Hewlett Foundation, 2007)

In the literature examined, there was a certain amount of tension between copyright and openness just as there was a tension between space and time, and there was evidence that copyright is implicated in Innis' monopolies of knowledge. For example, McGreal (2004) identified "copyright controllers" who try to shut down the Internet Commons by making it proprietary. These copyright controllers are bandits, according to Lyman and Varian (2003), who steal from the Internet Commons---which is the world's largest knowledge common and the premier information source---while building obstacles to access with copyright infringement law. Access to digital content and applications are crucial to distance education. "Copyright controllers" are corporate organizations such as Disney and Time/Warner/AOL, as well as many smaller players, which control the rights to movies and music. Chaplin's *Modern Times*, part of a course in the Communication Studies program at Athabasca University, suddenly became unavailable, leaving a YouTube message that said, "Blocked in your country on copyright grounds." Copyright can, thus, have a deleterious effect on learning. McChesney (2013) pointed out that corporate media has campaigned "to extend the scope and length of copyright and make enforcement as sweeping and penalties as onerous as possible" (p. 124).

Bates (2014b) has said, and it was confirmed by research in this study, that the use of OER by instructors is still fairly minimal and many OER are of poor quality. As well, the majority of OER are text-based and asynchronous, and what Harold Innis would

characterize as space-biased. Still, in theory, OER do break up Innis' monopolies of knowledge and, as this study has shown, there was some evidence in the literature to support this contention. Emphasizing the great potential of OER to make a difference, Nikoi, Rowlett, Armelli, and Witthaus (2011) pointed out, "Open education resources (OER) are taking centre-stage in many higher educational institutions globally, driven by the need to raise institutional profiles, improve the effectiveness of teaching and learning and achieve universal access to education"(p.191).

Many OER are made available in repositories, which is characteristic of a time-bias representing a concern for continuity and duration over time. McGreal (2014) pointed to a repository of OER (at OERKnowledgeCloud), which is supported by the UNESCO/Commonwealth of Learning/International Council for Open and Distance Education Chairs and offers access to over a thousand research articles and reports on issues of concern to distance education. OER initiatives in Africa include African Virtual University (AVU), OER Africa, the South African Institute of Distance Education (SAIDE), and the Teacher Education in Sub-Saharan Africa (TESSA) Project (Wright and Reju, 2012). Athabasca University is exploring ways to integrate OER into course development (Ives & Pringle, 2013). McGreal, Anderson, and Conrad (2015) noted that the Commonwealth of Learning (COL) based in Vancouver, British Columbia,

> is charged with promoting open education throughout the 53 countries of the Commonwealth. In 2013, in collaboration with the Indian Institute of Technology, Kanpur (IITK), they delivered a MOOC on Mobiles for Development to more than 2,000 learners from 116 countries including many non-Commonwealth countries, for example in Eastern Europe using a modified model of the cMOOC on Sakai's open

source platform and developing appropriate OER as YouTube videos (Reporter, 2014).

The analysis of the corpus through word frequency query, co-word analysis, and cluster analysis uncovered a certain tension between openness and copyright in OER and a time-bias was represented in the duration and continuity of the archiving of OER repositories. However, there is a sense that monopolies of knowledge implicated in a heavy all-encompassing space-bias can reverberate more widely throughout the culture and calcify in epistemological, ontological, and axiological dominance. Monopoly can mean a more hegemonic power over ways of thinking. For Innis, according to Watson (2006),

> What is "monopolized" is the control over the structuring of space and time. The ruling group, organized institutionally (e.g., the Christian church) and backed by a particular communications technology (e.g., parchment), maintains its power by formulating a particular conception of time…. However, it is also a monopoly because these sophisticated views, diffused through the framework of the church, come to dominate, in a vulgarized form, the common-sense conceptions of the era – so much so that, temporarily at least, any new and potentially competing conception of time is kept from gaining ground. (p. 328)

The ability to navigate through a high-speed medium and speak in a hypertext language, in the context of a heavily space-biased network of new technology, awash in commercial software and hardware, is a monopolizing knowledge (Menzies, 1999). An all-embracing monopoly has far-reaching epistemological, ontological, and axiological

implications for culture. Epistemological concerns define the nature and limitations of knowledge. We have seen the deleterious effect of copyright on learning. Ontology refers to the underlying assumptions of social reality, a version of reality in this study that is framed by heavily space-biased new technology. Axiological dimensions of an over-bearing monopoly relate to moral and value judgments. As mentioned, a contemporary philosophy of technology could enhance discussions of media in distance education; it is concerned with ethics (Brey, 2010; Verbeek, 2005; Verbeek, 2008). Within Innis' bias of communication is "a powerful moral voice" (Frost, 2003).

In the following section, Innis' plea for time is discussed in the context of new technologies in distance education systems, some of which may offset the heavy space-bias.

A Plea for Time

Innis' plea for time is really a plea for a balance between space and time biases in technology. There is much explicit appreciation of space in the corpus of this study, and very little explicit discussion of time. The majority of technologies in distance education are predominately space-biased, even though some technologies have voice and audio capabilities. In the literature review chapter, I discussed the possibility that among new technologies such as mobile devices, there is a mixture of space-biased and time-biased affordances. Babe (2008) maintained, "It is only the countervailing tendencies of multiple media that can ensure Innisian balance"(p. 14).

New mobile devices have voice-capabilities and, as such, can offset the dominance of space-biased technologies. Making more significant use of the voice-capability of mobile

devices would provide more of a balance between the affordances of Innis' time and space. While technically this is true, in practice, cellphone use is heavily weighted towards texting and not orality (Turkle, 2015), as this study discovered and confirmed. Mobile learning in this study was biased towards space as text messaging was found to be much more prevalent than speaking.

As mentioned earlier in this study, Ong's secondary orality is purported to create the conditions for resurgence of the oral tradition. Wikis, for example, have some time-bias affordances. Milberry (2012) pointed out, "The egalitarian structure of the wiki is based on decentralization of authority and horizontal self-organization" (p. 124). And further, wikis represent "the elimination of access barriers," in Innis' terms, elimination of monopolies of knowledge (p. 125). Text messaging is an example of fractured, spontaneous pointillist learning whereas cyclic learning takes place within a dialogic discussion forum. Innis' concept of time is cyclic and he views time-biased media such as speech to be dialogic.

. Ihanainen and Moravac (2011) argued that in online learning environments, time is *pointillist* and *cyclic*, forming an overlapping mode of time supplementing or replacing the more traditional *temponormative* rendering of time as linear. These three overlapping concepts of time may co-exist in simple and complex ways. According to Ihanainen and Moravac (2011),

> We present two virtual extensions to the traditional, linear conceptualization of time that emerge within ICT-enabled learning systems: (1) *pointillist* (dot-like) time, revealing itself through discontinuous, separate acts that participants can return to; and (2) *cyclical* time, illustrated by clusters of events in which intensive interactions

> occur for a period of time, and then cyclically reemerge as bursts of activity in the same or different forums after a certain amount of time has passed. These modes are not necessarily exclusive of each other, but often overlap, creating a diverse ecology of time constructs within learning systems. (p. 28).

Based on the results of this study, recommendations must be for more synchronicity and orality to offset the space-bias of distance education technology in order to enhance learning by connecting students to the social world outside academe, which includes orality and synchronicity. Orality and synchronicity in this study was highly related in frequency to collaboration and community. The oral tradition can inform the use of distance education technology. For example, drawing on "the strong African oral tradition," Ford and Leinonen (2009) used a mobile audio-wikipedia that supported increased access to information in a region "where the access to information, both paper-based and electronic, is limited" (p. 210).

Balance between time and space is difficult to achieve, as Innis says, "only at rare intervals are the biases offset by the influence of another medium and stability achieved" (p. 64). But there are other examples of a more respected use of oral discourse. Two areas where orality can be found and might inform distance education are indigenous oral cultures and the use of interactive radio in Latin America. These examples, which confirmed the findings of this analysis of the distance education literature, highlighted a demonstrated strong relationship between orality and interactivity and community.

Innis was very much a man of his times in one respect, as demonstrated by his failure to consider the oral cultures of the indigenous peoples of Canada, a culture he had

encountered in his study of the fur trade (Innis, 1927). As Roburn (2013) pointed out, "One enormous absence/silence is Innis's complete lack of estimation for the cultures of North American First Nations" (p. 310). Drawing on indigenous storytelling, Helmer (2012) wrote, "I would suggest that human life is filled with narrative enacted in and reflected upon storied moments of time and space" (p. 20).

Innis identified the increasing mechanization of the human voice represented by radio and cinema as having a deleterious effect on oral discourse. Still, Innis maintained that radio is also time-biased. As discussed earlier, radio serves as an illustration of the complex spatial and temporal dimensions that might be found in new technologies in distance education.

Online education in the West takes place in a predominantly asynchronous, text-based environment (Lobel, Neubauer, & Swedburg, 2002), as confirmed by a word frequency query, a co-word analysis, and a cluster analysis of the corpus in this study. However, the literature on interactive radio in Latin America places much value on synchronicity and orality. Lara, Howell, Dominguez, and Navarro (2001) argued that the results of their study on interactive radio "support the contention that synchronous discussion group interactions are an important feature of successful online courses with Hispanic students" (p. 50). Research such as this could inform distance educators in adding synchronicity and orality to course materials.

In what could prove to be valuable to distance education, anthropologist Edward T. Hall (1983) proposed two very general orientations towards time: monochronic and polychronic. Monochronic time is linear and measured by the sequential segmentation of

the clock. Polychronicity is more relaxed where time is seen as cyclical and relative. Polychronic is attending to more than one thing at a time. There is a need in distance education to further research how online learners perceive and structure their time. For Innis, the oral tradition is inherently more flexible and humanistic than the written tradition. With regard to the design and delivery of online experiences, Capdeferro, Romero, and Barberà (2014) claimed, "Polychronicity is a time-related cultural dimension of learning (Parrish & Linder-VanBerschot, 2010) that deserves greater attention in educational research" (p. 305). To reiterate the importance of this for the design of course materials, with regard to technology, Feenberg (2010) noted, "the device must function in a social world, and the lessons of the experience in that world influence design" (p. xvii). As stated throughout this study, new technologies are rapidly changing our notions of space and time.

Hall's (1983) polychronic time and monochromic time and Ihanainen and Moravac's (2011) pointillist and cyclic learning were the only theoretical discussions of time in the whole corpus. There were few time-biased technologies discussed in the literature studied; however, in one of those, Lee and Chan (2007) argued that

> podcasting, in combination with a variety of portable MPEG Layer 3 (MP3)-capable devices that are increasingly ubiquitous, can be used to deliver a form of m-learning that offers a higher degree of lifestyle integration than many current 'state of the art' m-learning applications, despite not being as technically complex. (p. 201)

In Lee and Chan's (2007) study, podcasting was used to present supplemental listening material in a course concerned with information technology. Podcasting is a combination

of Rich Site Summary (RSS) and multimedia materials. Athabasca University researchers have created a podcast channel to test three multimedia clips: audio, video, and enhanced audio with pictures (Hutchinson, Tin, & Cao, 2008). Taking a constructivist and student-centered approach, another use of podcasts involves engaging students in their own construction of knowledge. Lee, McLoughlin, and Chan (2008) believed that "the true potential of podcasting technology lies in its knowledge creation value, and its use as a vehicle for disseminating learner generated content" (p. 504).

Watson (2009) claimed that by filling his last three books with speeches that he had previously delivered to an audience, Innis was offering a defense of the oral tradition. Distance education in this study was found to be mostly soundless and silent, in terms of a lack of orality (speech) and sound to enhance learning materials. Certainly, more sound and orality could be incorporated into distance education materials along with more synchronicity to balance time and space. Orality and synchronicity were strongly associated with community and collaboration in this study. Zawacki-Richter et al. (2009) warned, "According to the experts, there is a need for more research on the pedagogical opportunities that Web 2.0 applications, mobile devices, and synchronous tools afford for teaching, learning, and assessment (micro level: teaching and learning in distance education)" (p. x). There is some evidence that students appreciate the option of synchronicity and orality in course materials. MacDonald, Bullen, and Kozak (2007) maintained that students placed great importance on interaction and strongly favoured face-to-face components as part of Web-based learning.

As discussed earlier in this study, the history of distance education can be described as

the colonization of Habermas' lifeworld (Sumner 2000). Since sound and oral discourse are deeply intertwined parts of Habermas' lifeworld, this study has argued that they should be part of distance education practice with more use made of time-biased media. Sound and orality provide context. Habermas' lifeworld is "the taken-for-granted universe of daily social activity" (Foss, Foss, & Trapp 2002, p. 242). Time is crucial to life and culture, as well as education. Hall (1959) in *The Silent Language* wrote,

> Time talks. It speaks more plainly than words. The message it conveys comes through loud and clear. Because it is manipulated less consciously, it is subject to less distortion than the spoken language. It can shout the truth where words lie. (p. 15)

The results of different analyses in this study discovered the terms *audio* and *multimedia* produced a low rate of return. The terms *voice*, *sound*, *podcasts*, *MP3*, *speech*, and *orality* were at the bottom of the lists of the word frequency query, the co-word analysis, and the cluster analysis of the corpus. Note that IRRODL, which pioneered the use and conversion of e-journal articles into a MP3 format (Killoh, Smith, & Wasti, 2007), are now removing MP3 files from the IRRODL site due to lack of use and cost considerations (Dr. Dianne Conrad, co-editor, IRRODL, personal communication, February 9, 2016). However, the word frequency, co-word analysis, and cluster analysis of this study did find evidence in the data of a strong association between orality and collaboration and community. Incorporating time-biased technology with synchronicity and orality into course materials would greatly benefit students and enhance distance education practice. Social media, which have some time-bias attributes,

though for the most part are lacking in orality and both podcasting and audio feedback, which utilize a human voice, should be strongly encouraged.

Worth repeating, Castell (2011) claimed that network technologies are "in a relentless effort to annihilate time" (p. 35). Similarly, Innis (1964) maintained, "the balance between time and space has been seriously disturbed with disastrous consequences to Western civilization" (p. 76). These are far from trivial matters. While serious attention must be directed towards time in distance education, Innis' plea for time is suffused with much urgency on a broader cultural scale. Still, Innis' philosophy of technology can begin in distance education with recognition and use of time-biased media with the affordances of interactivity, collaboration, and community. The answer to Innis' plea for time is to rectify an egregious imbalance. As Innis says, time is sacred.

Conclusions

This study examined the distance education literature as represented by five peer-reviewed journals published over 15 years and discovered a heavy space-bias described in distance education writing. Through three different kinds of analyses, this study found that distance education technology often tends towards present-mindedness and has some issues with monopolies of knowledge. Analysis discovered an illustration of present-mindedness in the wholehearted embrace of MOOCs without reference to the continuity of past research. Analysis also found a certain tension in the distance education literature between openness in OER and copyright in monopolies of knowledge. Uses of mobile devices associated with learning were heavily weighted towards texting and orality was found much underutilized. This dissertation was a plea for more use of synchronicity and orality to offset the space-bias in distance education technology. Innis' plea for time is

not just learning from the past, but is also a plea extended into the future.

Chapter Five Summary

Chapter Five: Summary, Discussion, and Recommendations presented a summary of the research completed in this study as well as described the conclusions that can be drawn from the word frequency, co-word analysis, and cluster analysis of the corpus. Based on these results, a discussion followed on the philosophy of technology, and Innis' present-mindedness, monopolies of knowledge, and a plea for time. The study concluded with some suggestions of areas for future research.

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Appendix A – List of Keywords

The following keyword list consists of lexical units (words, lemmas, or categories) that are selected from the literature review and the results of a word frequency query then used for producing the data to be further analyzed. Keywords in context are used subsequently in a co-word analysis and a cluster analysis.

KEYWORDS

Online	Phone
Open	Textbooks
Interact	Multimedia
New	Copyright
Access	CMC
Community	Affordances
www	Talk
web	Voice
Collaboration	Television
Internet	Constructivism
Classroom	Speaking
Network	Telephone
Book	Listening
Mobile	Broadcast
Current	Sound
OER	f2f
Video	Connectivism
Asynchronous	Videoconferencing

Print	Telecommunication
Mediated	Archive
Blended	coi
Dialogue	Podcast
Progress	Oral
Synchronous	Constructivism
Audio	Dialogic
Radio	Opencourseware
Sustainable	Twitter
Mooc	Audiotape
Tweets	Salience
Connectivist	Smartphones
Telecommuting	Audioconferencing
iPods	Monopoly
Teleconferencing	Behaviourist
Openlearn	Pencil
mp3	Audiocassettes
Cyberlearning	Videocassettes
Audiovisual	Unsustainable
Skype	Soundscapes
Telecourses	Cellphone
Communal	Retweets
Currency	Audiobooks

Appendix B – Word Count and Weighted Percentage

WORD	COUNT	WEIGHTED %
Learn	122047	1.63%
Student	99515	1.33%
Education	98634	1.32%
Distance	62509	0.84%
Online	58150	0.78%
Technology	30187	0.04%
Open	29563	0.04%
Interaction	22938	0.31%
Access	14817	0.20%
Community	14129	0.19%
Collaboration	10307	0.14%
Web	10275	0.14%
Internet	7976	0.11%
Network	7707	0.10%
Mobility	6347	0.08%
Book	6250	0.08%
OER	5925	0.08%
Video	5264	0.07%
MOOCs	4692	0.06%
Asynchronous	4067	0.05%
Print	3498	0.05%
Blended	3385	0.05%

Global	3285	0.04%
Synchronous	3047	0.04%
Dialogue	2515	0.03%
Audio	2389	0.03%
Textbook	2244	0.03%
Multimedia	1942	0.03%
Radio	1919	0.03%.
Phone	1764	0.02%
Copyright	1616	0.02%
Talk	1439	0.02%
Speak	1315	0.02%
Voice	1266	0.02%
CMC	1258	0.02%
Telephone	1146	0.02%
Moodle	1039	0.01%
Sound	835	0.01%
Connectivism	827	0.01%
Broadcast	790	0.01%
Archiving	763	0.01%
Facebook	756	0.01%
f2f	746	0.01%
WebCT	736	0.01%
Telecommunications	651	0.01%
COI	607	0.01%
Podcasts	539	0.01%
Speech	473	0.01%

Orality	465	0.01%
Twitter	401	0.01%
Library	277	0.00%
Wikipedia	249	0.00%
Skype	175	0.00%
MP3	142	0.00%
Soundscapes	10	0.00%
Audiobooks	2	0.00%