SOCIAL LEARNING
THEORIES

He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast.

Leonardo da Vinci

In this chapter we provide an overview of the major learning theories that influence the development of social learning activity, culture, and research. For each theory we focus on the environment or the context in which learning takes place, and the constraints and facilities provided through that context. When this context is changed by pedagogical intervention, technological affordances, social expectations, or a host of other variables, one can expect change in learning effectiveness or efficiency. Social learning—especially in its cyber-enhanced forms—has evolved in a context of rapid change, and many of its proponents are champions of this. However, the formal institutional structures where most of these changes take place are noted more for their resistance to change and defence of tradition, than for the capacity for rapid or emergent adaptation (Bates, 2005; Winner, 1997). Thus online learning has long been engulfed in controversy, and there has been considerable jockeying among those with a vested interest in either change or the status quo. While this tension will and probably should never be fully resolved, we believe that dedicated educators often share underlying assumptions about teaching and learning. This section is designed to explicate the rationale for social learning and expose both its promises and shortcomings.

SOCIAL LEARNING

The defining component of social learning is the presence and participation of other learners and, at least in formal education, a teacher. In this section we will
outline the theoretical and empirical evidence indicating how and why the presence of others makes a difference to both teaching and learning.

Until recently, most literature on social learning assumed that the interaction between participants takes place face-to-face, and often in a classroom, laboratory, or other structured context. However, recent pedagogical literature, especially from distance education and e-learning perspectives often assumes an electronically mediated context for teaching and learning. It is natural to wish to compare the online and face-to-face alternatives. When considered overall, studies reveal no significant difference in learning outcomes between activities and courses that are taken at a distance and those in the classroom (Russell, 2010). This is not too surprising because it is possible to use any learning technology well or badly, regardless of the type. It makes no more sense to ask whether people learn better at a distance or face-to-face than to ask whether pictures drawn in pencil are better than ones painted with oils. They are different technologies that can produce both excellent and atrocious results. That aside, the reliability of most studies that show the benefits of technology to learning are dubious, conflating many different factors (Oblinger & Hawkins, 2006; Russell, 2010). However, it is likely that the constraints and affordances of communication and information technologies, especially factors related to the limits of the media, scale, distance, and time, do effect how we learn from and with each other.

Different constraints and affordances will lead to different ways of doing things. Some methods will be difficult or impossible using certain media, but this is true in any setting. Just as it would not be wise to teach appreciation of music at a construction site or without the means to make music, it would not be sensible to teach programming without a computer. But the devil is, as always, in the details. Measuring the effects of teaching interventions and factoring in other contextual variables such as the nature and effectiveness of the technology, the users’ experience and efficacy, their motivation and the nature of the subject is difficult when they combine to create very complex and multifaceted learning environments.

GENERATIONS OF DISTANCE LEARNING

There have been many attempts to examine the history of distance learning in terms of dominant technologies (e.g., Bates, 2005; Gunawardena & McIsaac, 2004). We have taken a slightly different tack, looking instead at the evolution of pedagogies in distance learning (T. Anderson & Dron, 2011). These perspectives are not totally at odds because there is a strong case to be made for treating pedagogies
themselves as technologies that only bring about improvements in learning when used in combination with other technologies (Dron, 2012).

At the very least, pedagogies and technologies are intertwined in a dance, where the moves of one determine the moves of the other (T. Anderson, 2009). In our three-generation model, we have divided the generations of developments in distance learning into three distinct pedagogical eras; at the time of writing, the third generation is still emerging. We consider each generation to be partly determined by the communication and processing tools available, and partly by the popular pedagogies of the period, noting that changes in each one alters the adjacent possibilities and thus both the affordances and uses of the other. This co-dependency between tools and pedagogies is inevitable: until there are the means for cheap, rapid forms of many-to-many dialogue, for example, it is very hard to design distance learning experiences that require peer debate. Distance education was not a viable option at all until the advent of reliable and affordable technologies of production like the printing press, and communication systems such as a postal service.

Although we describe each generation as an historical sequence, this does not mean that previous generations have faded away or vanished. As Kelly (2010) has observed, technologies seldom, if ever, die. As new pedagogical models emerge, they do not replace what came before, though they may become more dominant than those they supersede. Not only is it possible to find large numbers of fairly pure examples of older approaches being used today, the newer generations incorporate the older ones in their assemblies so previous generations of pedagogy have become, if anything, more popular than they were when first adopted.

These are the three generations that we have identified as emerging so far:

1. Behaviourist/cognitivist: pedagogies of instruction
2. Social constructivist: pedagogies of construction
3. Connectivist: pedagogies of connection

We treat each of these in turn in the following sections.

THE INSTRUCTIVIST-ERA: COGNITIVIST/BEHAVIOURIST APPROACHES

Until fairly recently, there were very few alternatives to broadcast or distribute fixed media for distance learning. Mail, print, radio, TV, video or audio recordings made up the vast majority of media available to distance educators and students. Telephone, the postal service and, in some cases, two-way radio were about as
good as it got if two-way communication was needed, which meant that communication was nearly always one-to-many or one-to-one. Before the advent of the postal service, distance education as we know it today was virtually impossible, so it is no coincidence that the first examples of the form date from the late eighteenth century when such systems became ubiquitous and reliable (Gunawardena & McIsaac, 2004).

It is almost inevitable, without much capacity to communicate, that an instructivist approach will become the dominant form of teaching. The notion that there is a body of knowledge that can be represented in written, spoken, or enacted form and communicated from the learned to the unlearned is a powerful one at the best of times, but when it is combined with a communication channel that limits dialogue in both quantity and pace, an instructivist approach is overwhelmingly likely to occur. There are exceptions: Piaget's constructivist pedagogies (1970), for example, focus on the construction of knowledge by an individual rather than simple conveyance of knowledge.

Instructivist teaching has, however, not historically been the dominant form of pedagogy, at least in Western culture. The Socratic form of pedagogic dialogue, for example, is inherently social. Apprenticeship models, while explicitly acknowledging that there are masters from whom to learn, are essentially conversational. Learning outside schoolrooms has almost always been a two-way flow of information. The “teacher” (whether a parent, peer, or formal pedagogue) imparts knowledge through telling and showing, but equally must pay attention to how and whether a learner is learning. With this in mind, and given that the focus of this book is on social learning, we briefly overview some of the main features of the cognitivist/behaviourist model of learning.

Cognitivist/behaviourist pedagogies centre on the individual as an autonomous entity to which certain stimuli can be applied in order to achieve a certain measurable output. Behaviourist pedagogies deliberately go no further than these observable inputs and outputs (Skinner, 1974), whereas cognitivist approaches take into account the mental models and internal processes, building on a richer psychological understanding of learning and how it occurs (e.g., Bruner, 1966; Gagne, 1985; Gardner, 1993). In each case, however, the viewpoint is that of an individual, and the individual processes that are involved in learning. The cognitivist/behaviourist tradition is also predominantly instructivist, inasmuch as it is
assumed there is a body of material or specified measurable skill to be learned that may be transmitted to the learner. This mould begins to be broken in the Piagetian branch of cognitivism: constructivism (Piaget, 1970).

For Piaget and his followers, knowledge occurs as a result of connecting and constructing ideas, feelings, and structures. In cognitivist-constructivist approaches, learning is seen as a process of construction, building models, and connecting old knowledge with new. Every individual constructs a view of the world for him- or herself. This epistemologically different understanding of learning leads naturally to pedagogies such as problem-based, enquiry-based, and constructionist (learning by creating) methods of learning, which assume that, though there may be measurable outcomes reached by all, every individual constructs knowledge differently: starting somewhere different, learning differently, with different meanings attached to what they learn.

However, though epistemologically more advanced, the emphasis of such approaches is very much on the learner as an autonomous agent, learning alone. Although the learner may learn from others, learning itself is seen as something internal to the individual. This perspective is important: it is vital to understanding how individuals learn as much as how they learn with others. Much modern research in the area draws on our increasing knowledge of the brain and how we process and store information, leading to a field of study under the name of “brain-based learning” (Jensen, 2008; Weiss, 2000). Cognitive behavioural pedagogical models dominate training programs and much computer-based training, and have shown consistently improving results when teaching individuals to accomplish pre-determined behavioural objectives (see, for example, Fletcher, 2009).

LEARNING AS AN INHERENTLY SOCIAL PROCESS

Processes of meaning-making, integrating new information, and creating knowledge are not only enhanced and stimulated through reaction, discussion, and argument with others but also much knowledge confirmation, interpretation, contextualization, and validation happens only through interaction with others.

In an interesting study, Okita, Bailenson, and Schwartz (2007) tested learning and the degree of arousal (associated with engagement) for learners who believed they were interacting with an avatar controlled by a human being, versus those who believed they were interacting with an animated but machine-controlled agent. They found that the belief that one was interacting with a human resulted in both better learning outcomes and more engagement with the learning task.
Further confirmation that we think and behave differently when we believe we are interacting with humans comes from a fascinating study by Krach et al., (2009), in which all subjects engaged in the same task (interacting with a computer to play the Prisoner’s Dilemma), but showed significant differences in functional MRI scans depending on whether they believed they were interacting with a machine or a human. This does not mean that learning cannot or does not happen when an individual is studying on his or her own or interacting with simulations, tutorial systems, or other learning modalities, but it does highlight the increased attention of learners when they are, or believe they are, interacting with real human beings.

Humans have evolved for millions of years in contexts where shared support and cooperative activity has increased survival probabilities (E. O. Wilson, 2012). Thus we have evolutionary propensities for positively opening our social and learning selves to others who serve as models and sources of information, and who provide direct assistance in solving many types of problems. In our primordial past, and perhaps to a greater degree in our networked future, human beings will continue to exploit and benefit from the support and assistance of others. In the past these potential assistants shared common time and space—now they are available anytime and anyplace.

SOCIAL LEARNING THEORIES

The poet John Donne’s proclamation that no man is an island suggests our deep interdependence with others. It is an interesting but perhaps irresolvable debate as to which came first—whether it was the emergence of self from the family or tribal origins, or whether society emerged from the aggregation of many selves. Even when we are working alone, our language, metaphors, thoughts, and feelings are guided and created through the use of signs, symbols, and expressions that we have acquired from others. John Dewey’s colleague and fellow pragmatist George Herbert Mead is most remembered for his notions of how a sense of self can only arise through discourse with others. He notes how “we are in possession of selves just in so far as we can and do take the attitude of others towards ourselves and respond to those attitudes” (qtd. in Pfuetze, 1954, p.78). But Mead goes even further, arguing that in interaction and cooperative work with others, the giving and taking of directions and advice allows us to develop critical forms of empathy to create appropriate and viable images of ourselves. He argues that “in giving directions to others, he gives them to himself, and thus arouses a similar response
in himself which is understood by himself” (Pfuetze, 1954, p.79). This lays the groundwork for responsibility and self-control.

Lave and Wenger argue, “activities, tasks, functions, and understandings do not exist in isolation; they are part of broader systems of relations in which they have meaning. These systems of relations arise out of and are reproduced and developed within social communities, which are in part systems of relations among persons” (1991, p. 53). For most early psychologists, this social development and growth of the self took place in wide varieties of face-to-face interaction and dialogue that has characterized human evolution from the earliest times. Now, however, face-to-face interaction is but one of many modes through which we see ourselves reflected in the response of others. Whether mediated interaction inevitably suffers due to social cues being filtered out or the media allows forms of hypermediation (Walther, 1996) that affords more effective means of social interaction, is at present an unresolved issue. However, there can be no doubt that mediated interaction has come to form a major role in supporting cooperative work, collaborative understanding, discourse, and individual growth, as media use consumes an ever-greater proportion of our daily lives.

Much social learning theory developed in reaction to the behaviourist notions that learning resulted only from direct exposure to reinforcements and punishments, and further from cognitive notions of individual knowledge acquisition. Albert Bandura and others argued that people learn a great deal without experiencing rewards or punishments directly but through vicariously observing the effect of these on others. Bandura (1977) wrote, “learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Fortunately, most human behaviour is learned observationally through modelling: from observing others one forms an idea of how new behaviours are performed, and on later occasions this coded information serves as a guide for action” (p. 27). Bandura further noted the necessity of opportunities for practice. This practice is best done in social contexts so that it can be refined through reaction and feedback from others.

Humans learn socially in many ways, and one of the oldest of these is imitation (Warnick, 2008). Aristotle argued, “To imitate is, even from childhood, part of man’s nature (and man is different from the other animals in that he is extremely imitative and makes his first steps in learning through imitation)” (1997, p. 57). Imitative learning has most often been studied among infants, but models of technical and cognitive apprenticeship also celebrate the effectiveness and efficiency of learning by imitation. However, learning by imitation has historically been limited
by both time and space. Geographic separation can be overcome to a limited degree by video and immersion, but time restrictions also occur in place-bound and traditional forms of imitation. Asynchronous imitation occurs when one models the behaviour, consciously or unconsciously assesses the means of expression, the rationale, or the arguments of others as displayed in their asynchronous uttering. This modelling often occurs when responding to discussion or problem sets, to which the answers of others already serve as visible models.

Social learning looks to the authentic clues that arise from interaction with others in a specific context. In the everyday interactions of individuals, problems arise and through negotiation, acquisition of information, and reflection, these problems are resolved (Dewey, 1916). Learning is not only the accumulation of facts and the understanding of concepts but also is both induced and confirmed through interaction and discussion with others. Even when one is alone, the shared use of language, cultural concepts, signs, and symbols both afford and constrain our understandings and creation of knowledge (Brown, Collins, & Duguid, 1989).

Social scientists have long struggled to match the predictability of their laws of human behaviour with those developed in the natural sciences. Cognitive and behavioural learning models have strong roots in empirical science, in which the discovery of generalized laws of learning that can be applied across contexts is a major goal. One of the popular attempts used in economics and game theory is to develop models where rational decision-making on the part of the individual is assumed. However, Buchanan (1985) notes that rational theories break down because people talk to one another, change their minds, and utilize both overt and covert efforts to change others. Thus the capacity to communicate with one another is an essential skill and, as we have discussed, has long been an important tool for learning. However, communication and learning (whether face-to-face or at a distance) are very complicated—influenced by a host of variables including context, skill, attitudes, and the form of mediation used to convey that communication. In later chapters we focus on ways that our conceptual model of social organization may reduce this confusion. We next turn to pedagogies that were specifically developed to benefit from our propensity and capacity to learn socially.

**Social Constructivism**

Constructivism of the non-social variety has deep philosophical and pedagogical roots, and has been associated in a learning context with the works of John Dewey, George Herbert Mead, and Jean Piaget. Like many popular theories, it has been
defined and characterized by many, often with little consistency among authors. However, all forms of constructivism share a belief that individuals construct knowledge dependent upon their individual and collective understandings, backgrounds, and proclivities. Debate arises, however, over the degree to which individuals hold common understandings, and whether these are rooted in any single form of externally defined and objective reality (Kanuka & Anderson, 1999). Since much of constructivism is touted as driving the current educational discussion, it should be noted that it is a philosophy of learning and not one of teaching. Despite this incongruence, many authors have extracted tenets of constructivist learning, and from them developed principles or guidelines for the design of learning contexts and activities.

Drawing mainly from the work of Vygotsky and Dewey, social constructivist models of learning emerged in the early part of the twentieth century, though they were only adopted on a widespread basis by the academic community from the 1970s onward, after Vygotsky’s work was discovered in the West, and Dewey’s half-forgotten writings began to be reinterpreted in the light of a Vygotskian understanding (e.g. Popkewitz, 1998). From a social-constructivist perspective, knowledge and knowledge creation is a fundamentally social phenomenon. Not only are meanings negotiated and formed in a social context, the process of education is one where learners move from one zone of proximal development to the next, mediated by others who have already reached beyond where the learner wishes to go. In distance learning, social constructivist approaches were prohibitively expensive until the advent of affordable communications technologies. While there are many variants on the theme, social constructivist models share a number of common features that we outline in the following subsections.

**Multiple Perspectives and Engagement that Includes Dialogue**

Since knowledge is both individually and socially constructed, it follows that there must be opportunity, reason, and capacity for individuals to share, debate, and discuss their understandings. Individually, discussion is used to validate knowledge construction and to test its veracity against the understandings of others. Socially, groups of learners use one another to both amplify and dampen their understandings so as to construct understandings that are congruent—at least to the extent where cooperative action can be undertaken.

**Learning in Authentic Contexts**

If learning is to be meaningfully constructed, it must have worth for the individual learner. This value arises most easily if learning takes place in authentic contexts.
with genuine personal value that is perceived by the learner as both interesting and useful. Unfortunately, there are domains of knowledge that, in themselves, have little intrinsic meaning (at least for the majority of learners), but they are considered prerequisites for acquisition of more relevant knowledge to be studied at a later time. This focus on the prerequisite, regardless of its own authenticity or relevance, is typically over-valued by discipline-centred teachers, resulting in learners often being forced to ingest large quantities of information with little apparent value. Constructivist practitioners of authentic learning design activities that are wide-ranging enough so that their connection to the relevant “big picture” is apparent even at early stages of inquiry.

**Inquiry and Problem-Solving**

The inquiry and problem-solving features of constructivist learning emerge from the need for authentic contexts. Problems not only situate the learning in an authentic task-driven challenge but also provide motivation and focus to the learning process (Jonassen, 2002). This is especially important in collaborative learning where the diversity of interests, expertise, and aptitude may cause groups to move away from constructive problem-solving toward following the interests of dominating or particularly interesting diversions.

**Learning is Open Ended and Ill-Structured**

Most learning does not take place in classrooms, but in the real-life context of authentic problems situated in ill-structured environments (Spiro, Coulson, Feltovich, & Anderson, 1988). Thus constructivists prefer to situate learning problems in messier domains where there is no single comprehensive and correct answer. The ill-structured domain of the problem also stimulates discussion among learners as they attempt to construct a useful understanding of the domain and develop solutions to problems.

**Cooperative and Collaborative Learning**

Despite that fact most formal education takes place in group settings, very little of what goes on in traditional classrooms or online can be described as cooperative or collaborative. Rather, both teachers and learners usually conceive of learning as an internal cognitive process. Indeed, in many learning designs, students are set as competitors against one another, each striving for a limited number of high grades that will be allocated by the teacher.

Despite this individualistic orientation in current practice, there is a growing body of research demonstrating that cooperative and collaborative education not
only results in greater learning but also is perceived by students as generally being more satisfying, and is associated with lower dropout rates. In a large meta-analysis of studies that included over 4,000 students comparing cooperative and collaborative learning to traditional individualized study, Springer, Stanne, and Donovan (1999) concluded that “students who learn in small groups generally demonstrate greater academic achievement, express more favourable attitudes toward learning and persist through science, mathematics, engineering and technology courses to a greater extent than their more traditionally taught counterparts” (p. 22).

There is an ongoing and generally inconclusive debate in the literature differentiating collaborative from cooperative learning. Generally, collaborative learning is considered to be less teacher-driven and more ill-defined than cooperative learning. Learners working collaboratively deliberately support one another’s learning, negotiate the division of tasks, and help one another to learn by using and/or developing group processes in more or less formal ways to produce some common or individual outputs. Cooperative learning tends to be based on more structured sharing. For example, students may research topics independently, or focus on parts of a broad topic and share them with others in the class. Although many writers and teachers use the terms interchangeably, we will be fairly specific in defining collaborative learning as a process where learners deliberately work together to achieve outcomes of mutual benefit, and cooperative learning as a process where independent learners do work that benefits themselves and other students. Despite sometimes contested differences, there is a great deal of common theory and practice in both collaborative and cooperative learning. These similarities include:

- A teacher who is usually more a facilitator or guide than a “sage on the stage”
- Teaching and learning as shared experiences
- Students participating in small group activities
- Students taking responsibility for their own learning and that of their group
- Students stimulated to reflect on their own assumptions and thought processes; and
- Social and team skills developed through the give-and-take of consensus-building (adapted from Kreijns, Kirschner, & Jochems, 2003, p. 337).

In Springer et al.’s meta-analysis (1999), attempts to describe learning designs they investigated as either cooperative or collaborative and then comparing results revealed no significant differences in outcomes. However, the collaboration or cooperation reviewed in these studies took place in face-to-face interactions.
a smaller study comparing the two in online interactions, Rose (2004) found that
groups characterized as cooperative achieved higher degrees of in-depth process-
ing in a shorter period of time than those working collaboratively. This finding is
consistent with our own experiences of online learning in which coordination,
task clarification, assignment, and negotiation seems to take longer in online and
especially asynchronous online contexts. Of course, such skills are themselves
valuable, need to be learned, and may contribute to outcomes that are not inten-
tionally measured.

Given the theoretical and empirical evidence supporting the use of collabora-
tive and cooperative learning designs, one might reasonably ask why this model is
not employed more often in formal education. The answers may lie in the social
norms that privilege independence and individualism in many Western countries.
However, there are also pedagogical, organizational, and technical problems that
challenge collaborative design implementations. From a pedagogical perspective,
many educators conceive of learning as an individual process, and assess it as such
accordingly. The central role of assessment in institutional learning thus drives it
toward patterns that emphasize the individual at the expense of the group.

Communities of Inquiry

Our final model of conventional social learning, Communities of Inquiry, is partly
a systems theory and partly a model for analyzing learning transactions that both
predicts and describes behaviours. It concerns the elements that are essential to
the social educational experience. Explicitly concerned with group learning (see
figure 2.1), it identifies three kinds of presence within a social learning transaction:

- **Cognitive presence.** The extent to which participants can construct meaning
  through reflection and discourse,

- **Social presence.** The extent of identification with a community and trusting
  inter-personal engagement, and

- **Teaching presence.** The design, facilitation, and direction of social and

We will return to the community of inquiry model in some detail later but, for
now, note that it provides a way of understanding how learning occurs within a
group setting, where a group of intentional learners and one or more teachers
build knowledge together.
The Connectivist Era

We argue throughout this book that the affordances of cyberspace offer new ways to approach all forms of human interaction and communication, including education. It is thus not surprising that new pedagogies and theories of learning have arisen that attempt to both explain and provide guidance to educators when teaching in net-infused contexts. There are many related theories that help to explain and recommend approaches to learning in networked contexts, outside the classroom. Each addresses a set of related concepts:

- learning is and should be unfettered by formal boundaries and delimited groups;
- learning is not just a feature of individuals, but of communities;
- learning is distributed not just in the heads of humans but in the tools, conceptual and physical, that they use, the artifacts they create, and the environments they build and inhabit;
- knowledge exists in a social and physical context as well as a personal one;
structure and meaning can be an emergent feature of the dynamic learning system in which many individuals, loosely joined, can play a role in creating; • diversity has value to the whole learning community, and individual differences should be valorized.

Since the late twentieth century, these themes have emerged from multiple disciplinary areas and, in sum, add up to a new and different way of thinking about learning. In making this assertion, we distinguish Connectivism (a theory created by George Siemens (2005)) from connectivism with a small “c,” which we use as a generic term for a family of network learning theories. Just as there are many different variations on social constructivism that share the unifying characteristics, so there are variations of connectivism that share the common properties of knowledge emerging from and within a network.

FOUNDATIONAL THEORIES FOR CONNECTIVIST-ERA MODELS

In the following subsections we explore some of the theories and models that have informed the connectivist era. While incomplete as theories of learning or teaching in themselves, they are woven into a fabric of ideas that informs the two most distinctive connectivist learning theories, communities of practice and Connectivism itself.

Heutagogy

The principles (and naming) of heutagogy were first articulated by Australian educators Stewart Hase and Chris Kenyon (2000). Heutagogy (derived from the Greek word for “self”) is a direct result of self-determined learning theories and practice. Heutagogy brings these theories into a networked context by noting the ways in which the tools and resources for effective self-determined learning have been expanded exponentially through cyberspace. However, access to tools does not ensure that learners are capable of using them effectively. Thus, Hase and Kenyon also note the importance of capability in heutagogically based education. They write, “capability is a holistic attribute and concerns the capacity to use one’s competence in novel situations rather than just the familiar, a justified level of self-efficacy for dealing with novel problems, having appropriate values, being able to work in teams, and knowing how to learn” (Hase & Kenyon, 2007, p. 113).

Heutagogy also stresses the need for learners to understand their own learning processes. This reflective capacity allows learners to direct their own learning when needed—even in the absence of a formal education structure. Interesting
as well is Hase and Kenyon’s (2007) distinction between competencies (the darling of many, especially vocational educators) and capability. Competencies are tested in known contexts and usually are focused backward on instruction already provided. Capability, however, looks to the future and celebrates the capacity to learn as contextually demanded. Increasingly, both workplaces and schools are changing rapidly, and thus the competencies acquired last year or last month may not provide the capacity to learn and apply that knowledge going forward in those environments.

Hase and Kenyon end their 2007 paper with a list of ways in which Heutagogical pedagogies are used to design learning processes applicable inside or outside of formal education. These capacities are magnified by the net-infused context in which collaboration, student input into content selection from vast open educational resources, self-reflection through tools like blogs, and greatly enhanced flexibility in where and when to learn are all afforded.

Distributed Cognition
The field of distributed cognition, originally developed by Edwin Hutchins (1995), is concerned with ways that the tools, methods, and objects we interact with may be seen as part of our thinking processes and extensions of our minds into the world. Rather than thinking of cognition as an internal process of thought, proponents of this perspective observe that memories, facts, and knowledge may be reified and embodied in objects and other people we interact with. In many cases, the environment places constraints on our thinking and behaviour, or influences us to think and behave in certain ways and, in many cases, is an integral part of thinking. Objects and spaces are participants in the cognitive process, not simply neutral things that we use, but an inextricable part of how we think and learn, both as individuals and as connected groups (Salmon & Perkins, 1998). S. Johnson provides a nice illustration of this: he talks of the successful landing of a plane damaged by geese as “a kind of duet between a single human being at the helm of the aircraft and the embedded knowledge of the thousands of human beings that had collaborated over the years to build the Airbus A320’s fly-by-wire technology” (2012, Introduction, Section 2, para. 10). Knowledge is not just held within the artificial intelligence that guides the aircraft—although the subtle interactions with the autopilot do play a role—but in the design of controls, seats, and other artifacts through which pilots, co-pilots, and others interact with one another and the vehicle (Hutchins & Lintern, 1995; Norman, 1993). Similarly, we as individuals offload some of our cognition onto the objects around us—the organization of
books on a bookshelf, the things we lay out on our desks, the pictures on our walls, and the cutlery in our kitchen drawers, all act as extensions of our minds that both reflect thinking and engender it. As Churchill (1943) said, “We shape our buildings and afterwards our buildings shape us.”

Distribution not only applies to unthinking objects but also to us and the people around us: cognition is a social process where different people play different roles, leading to the distribution of knowledge within a group or network of people (Salmon & Perkins, 1998). A simple demonstration of this is the loss of cognitive capacity that occurs when couples split up or one partner dies. The remaining individual will have come to rely on their partner to remember things, perform activities from washing dishes to doing accounts, and vice versa, a process sometimes described as “socially distributed remembering” (Sutton, Harris, Keil, & Barnier, 2010). Whether in intentional organizations or looser networks, this socially distributed remembering allows us to do more and think further (S. E. Page, 2011).

**Activity Theory**

Most commonly associated with social constructivism but equally central to understanding connectivist models, activity theory emerged from the work of Soviet psychologists in the early-to-mid twentieth century such as Leontev and Vygotsky, who were attempting to find ways to explain how individuals and objects worked together as dynamic systems. The binding concept of an activity from which the name is derived is concerned with subjects doing things, typically together, engaging in activities through mediating objects or tools—be they physical or mental objects. It was elaborated on and brought to the West primarily by Engeström (1987) who added “community” to Leontev’s individual and object as a fundamental unit of interaction.

One of Activity Theory’s most distinctive features is its insistence that, in understanding the mental capabilities and learning of an individual, it makes no sense to treat an isolated person as a unit of analysis: the physical, cultural, and technical world that he or she inhabits is as much a player in any activity as the mental processes of the individual who engages in it. Activity Theory describes actions in a socio-technical system by considering six interdependent and related dimensions:

The object—the purpose of the activity
The subject—the individual actor
The community—the combination of all actors in the system
The tools—the artifacts used by actors
The division of labour—how work is divided and tools mediate the activity
The rules—things that regulate and guide the system

These interdependent parts are usually represented as a pyramid that illustrates their interactions (see figure 2.2).

![Figure 2.2 Activity theory view of a human activity system (Engeström, 1987, p. 78).](image)

Activity Theory is not predictive, but provides a framework for understanding the complex ways that humans interact with the world and one another through mediating artifacts. The main lesson to take from its sometimes arcane perspective on the world is that, if we are to understand the ways individuals behave in a social context, it is important to consider not just their mental processes, but their interactions with the entire activity system including, importantly, the physical and mental tools and processes that they use. Combined, they provide a way of understanding consciousness as a social phenomenon that extends into and is inextricable from the world, the tools, and the signs (notably language) that people employ. In a very real sense, tools mediate between people and the world, not as simple channels, nor as a means of achieving ends, but actively affecting how the world is experienced and perceived. This makes it highly relevant to the context of networked learning, in which interactions are mediated and objects play not just a supportive role, but an architectural one in learning.
Actor Network Theory
Like Activity Theory, Actor Network Theory (ANT) is concerned with systemic interactions of people and the objects that they use in their interactions. While sharing some of the terminology and related conceptual models of activity theory, Actor Network Theory emerged from a very different tradition and has a complementary agenda. Conceived by Latour (1987, 2005) and elaborated by Law (1992), it was created in the context of social practices in science and technology, mainly in reaction to sociological and technologically determinist views of the role of technology in society. Latour, in particular, sought a “scientific” way of describing the behaviours of people that avoided self-referential explanations of the “social,” therefore avoiding latent assumptions. His objective was to rebuild sociology from the bottom up without reference to what he saw as fuzzy or ill-defined terms that had bogged down the discipline, most notably eschewing use of the term “society” itself as a simple given.

Actors in an actor network may be human or non-human, with no special priority given to either. Instead, actors are constituted in heterogeneous relationships with one another: they form networks of related pieces that have no distinct edges. Given that such networks are continuous and unbounded, ANT helps educators to understand how some collections of actors may be thought of and considered as individual actors in their own right—for example, we can say things like “Athabasca University tops the league table of open universities,” or “the US invaded Afghanistan.” In the language of ANT, some networks may be black-boxed. In other words, we may choose to treat a complex network as a single entity, and to consider it in its relationships with others as a single actor.

Complexity Theory and Complex Adaptive Systems
Another notable feature of theories from the connectivist era is that they describe emergence and draw on the dynamics of complex systems. Complex systems are those where new and often unpredictable behaviour emerges out of multiple interactions of entities, where the interactions are known and follow fixed rules: the weather, for instance, is a good example of this, as are rainforests and eddies in flowing water. Complex adaptive systems (CASs) consist of interacting entities that adapt in response to changes often brought about by other entities: evolution, ecosystems, cities, economies, stock markets, and termite mounds are good examples of these (Kauffman, 1995).

Educational systems may be thought of as CASs: while they are typically constrained by top-down governance and rules that determine the range of
behaviours that can occur, there are many parts which are complex and adaptive, including learning itself, where patterns and behaviours emerge as a consequence of individual actors and their interactions. Once we enter the world of informal learning, especially in the context of networks and sets, patterns that emerge are almost always complex and adaptive but, even in the most controlled institutional learning contexts, educational systems are open, unbounded, and connected to human and natural systems. This is the problem that confronts any educational researcher who attempts to analyze the effectiveness of a given intervention: it is never, in principle, possible to control all the variables that may affect any learning transaction.

Emergent behaviours arise when autonomous yet interdependent agents interact with one another within a context that partly determines the possibilities of interaction, and that is itself warped by the interactions of agents within it. This means that one of the most important defining characteristics of all complex systems is that they are, at least at some scales, unpredictable. While we can recognize patterns and broad tendencies, it is theoretically impossible to predict any particular event. The famous “butterfly effect,” whereby the flap of a butterfly’s wing in one part of the world might cause a storm in another, was a term originally coined by Edward Lorenz to describe his work (Lorenz, 1963) on what would later come to be known as chaotic systems. Lorenz (1963) showed conclusively that, though an entirely deterministic system, the weather at any given time is impossible to reliably and accurately predict from a previous known state. That a butterfly’s or (in its original formulation) a seagull’s wing flap can affect weather systems on the other side of the planet is a captivating, mathematically provable if empirically untestable image. Such sensitivity to initial conditions is observable in far more mundane and commonplace events that we can more easily observe, such as the movement of individuals in a crowd, the patterns of drips from a tap or the cascades of sand on a dune. But hand in hand with unpredictability come large-scale emergent patterns, in which higher levels of order emerge from small-scale interactions, such as can be seen in everything from ripples on a pond to life itself (Kauffman, 1995). In an educational context, theorists look for and attempt to predict “transformations or phase transitions that provide the markers for growth, change, or learning” (Horn, 2008, p. 133).

If systems are complex and unpredictable, they are not easily explained by positivist researchers and educators who attempt to eliminate or control all the variables that affect a learning transaction. Rather, those with a perspective based on recognizing complexity seek social structures that allow effective behaviour
to emerge and evolve and ineffective ideas to be extinguished. Researchers in CASs seek to understand features of the environment, and especially social or structural norms or organizations that resist either overt or covert attempts at self-organization. Such attempts to stifle emergence may be impossible and involve a large expenditure of effort. Horn argues that “the management of social organizations of all types has been maintained by control measures that work to block the capacity of systems to operate autonomously” (2008, p. 133). These blocking mechanisms were designed for educational systems so that learners can operate in close proximity with one another without becoming mutually destructive or descending to chaos. But these same control mechanisms can thwart the emergence of adaptive behaviours and phase shifts that provide potential for rapid and profound learning.

Implications of complexity theory for learning and education operate on at least two levels. At the level of the individual learner, complexity theory, like constructivist theory, supports learners’ acquisition of skills and power such that they can articulate and achieve personal learning goals. By noting the presence of agents and structures that both support and impede emergence of effective adaptive behaviour, individual learners are better able to influence and indeed survive in often threatening and always complex learning environments.

At the organization level of either formal or informal learning, complexity theory points to the social structures that we create to manage that learning. There is usually some level of self-organization going on in all complex systems, brought about by a combination of diverse learners with diverse backgrounds, needs, interests, and a wide range of ways to interact with one another, their surroundings, teachers, and learning resources. Any schoolteacher who has experienced a wasp or a thunderstorm in a classroom of children will be familiar with the way that small perturbations can have large effects on the learning behaviours and activities that are occurring, no matter how well planned they might have been in the first place. Even so, most of us can recall occasions when poor and stultifying approaches to teaching still resulted in good learning, often because of interactions with other learners or the chance discovery of interesting learning materials.

Good teachers adapt and change behaviours as the environment, context, and interactions between learners change. However, the self-organizing facets of a learning system can work against this, making it an uphill struggle. Complexity theorists (e.g., Kauffman, 1995, p. 233) talk of different levels of orderliness in self-organizing systems: the “Red Queen” and “Stalinist” regimes. When there is too much chaos and unpredictability, systems are always running to stay in the
same place, like the Red Queen from *Alice Through the Looking Glass*. Conversely, if there is too little dynamism and change, then things settle down to a fixed and unchanging point or set of points—the Stalinist regime. Neither is helpful in learning. From the point at which these management functions begin to inhibit the emergence of positive adaptive behaviour or facilitate and sustain behaviours that are not conducive to deep learning, we can expect negative results. The emergence of complex self-organized behaviour occurs between the realms of chaos and order, for which Doyne Farmer coined the term “the edge of chaos” (Langton, 1990). Organizational structures should help us to surf the edge of chaos, not eliminate or constrain the creative potential of learners and teachers. Further, this understanding can guide us to create and manage these complex environments, not with a goal of controlling or even completely understanding learning, but instead with a goal of creating systems in which learning emerges rapidly and profoundly.

Complexity theory also encourages us to think of learning contexts—classrooms, online learning cohorts, and so on—as entities in themselves. These entities can be healthy or sick; emerging, growing, or dying. By thinking at the systems level, reformers search for interventions that promote healthy adaptation and the emergence of cultures, tools, and languages that produce healthy human beings.

Learning designers following complexity models eschew the linear processes associated with much instructional design theory. Rather, they situate learning in contexts that are characterized by fluidity and turbulence, located near the edge of chaos, with rich possibilities for diverse actions and reactions, in complex contexts, and the presence of strange attractors, where order emerges from chaos. Most importantly for our study of networked learning, high-quality learning contexts are marked by “interconnectedness of and intercommunications among all parts of the system” (Laroche, Nicol, & Mayer-Smith, 2007, p.72). Thus, individual learning is enmeshed in the complex social experience and context of group, network, and collective social activity and culture.

Complexity theorists have drawn examples from many contexts to show the power and usefulness of emergent organizations and their capacity to thrive without total understanding, much less control, of the context in which they exist. Connectivist-era models of learning embrace this uncertainty and seek ways to utilize complexity without the potential drift to chaos that a lack of top-down organization might entail.
Two connectivist theories have emerged as central and archetypal. The first, with the longest history, is that of communities of practice and its successor, networks of practice. The second is Connectivism, as propounded by its creator Siemens, with contributions from his collaborator Stephen Downes.

Communities of Practice
The theory of communities of practice was established in the work of Lave and Wenger (1991) and fully expounded in Wenger’s seminal book, Communities of Practice (1998). Lave and Wenger sought to explain and improve upon learning that occurs outside of formal group-based courses, typically in the workplace or among co-located learners in communities. The theory describes primarily informal processes of community formation and growth, though much of Wenger’s more recent work has focused on approaches to deliberate fostering of such learning communities. The concept, drawn from anthropological studies, relates to how newcomers to a collection of people, such as a department in a firm, a university, or a group of charity workers, learn the group’s practices and become participants in the community. At first, Lave and Wenger used an all-encompassing notion of “legitimate peripheral participation” to describe the process of becoming a full member of the learning community, but Wenger’s later work unpacked this in terms of

- mutual engagement—the group-like formation of shared norms and methods of collaboration,
- joint enterprise—a shared set of goals and purposes, also known as the community’s domain, and
- shared repertoire—a set of resources, both physical and conceptual, that the community shares (Wenger, 1998, p. 73).

The concept of shared repertoire, in particular, echoes the notion of distributed cognition and sharply distinguishes this as a networked learning theory, in which both human and non-human actors in a network are mutually constitutive and joined together. Part of the value of the concept of a community of practice is that it treats learning as dynamic and situated, and describes ways that tacit knowledge spreads through a network, as opposed to the more formal methods of deliberate learning that may convey explicit and implicit knowledge, but do not (and, according to Polanyi (1966) cannot) succumb to explanation and formalization.
A particularly powerful aspect of the theory is its description and explanation of boundaries. In a conventional intentionally formed group, boundaries are defined easily: one either is or is not a member of the group, and there is usually a process involved in joining or leaving it. In the fuzzier realm of communities of practice, boundaries are typically emergent phenomena that arise out of shared practice, a bottom-up process resulting from the joint enterprise that naturally channels the community and separates it from others. Central to this idea is the importance of those who exist at or near the boundaries, and who cross them between communities of practice. Boundaries are spaces where learning is particularly likely to happen, because that is where different conceptual models are likely to clash or merge, where “competence and experience tend to diverge: a boundary interaction is usually an experience of being exposed to a foreign competence” (Wenger 1998, p. 233).

The divergence can be both creatively inspirational and a cause of conflict. Wenger’s boundary-crossers may be networked individuals who move beyond and between closed communities, cross-fertilizing each community with ideas and practices of others. There may be more or less concrete boundary objects, including symbols and metaphors that are technological connectors like social software platforms and the processes enabled through them, which act as a means to bridge different communities. Communities thus become networked by boundary-crossing in order to play the role of one another’s teachers, spread knowledge within the community, and also engender changes in knowledge in other communities.

Models and interventions based on communities of practice have been widely adopted in many sectors. The concept is not, however, without its problems. First, the term carries multiple terminology and disciplinary understandings associated with the word “community.” Second, different researchers often understand the degree of formality of the “practice” differently. The “community of practice” label has been applied to emergent, informal, and spontaneous organizations of face-to-face professionals, but it has also been used to describe managed professional development activities which almost preclude only voluntary participation. Schlager & Fusco (2004) use the term extensively to define, and Wenger’s theory to describe, online educators’ forums (such as TappedIn); yet after years of studying this rather large community of practice, “the question of whether the users of the TappedIn environment collectively constitute a community or practice remains unresolved” (Schlager & Fusco, 2004, p. 121). In many ways, the blurring of the term has led to it being hijacked by those who are more fixed in a social-constructivist...
model of the world, so although communities of practice are, in the way Wenger first described them, in the vanguard of the connectivist era of learning theories, they still have one foot firmly planted in older models of learning.

**Networks of Practice**

Perhaps because of the fuzzy borders between networked and grouped ways of thinking of communities of practice, Wenger, Trayner, and Laat (2011) have extended the notion of communities of practice for the networked age, taking advantage of more recent work that treats networks and groups as distinct and separable social forms (e.g., Downes, 2007; Rainie & Wellman, 2012; Siemens, 2005). Although Wenger's earlier work did describe ways that knowledge spreads through a network, he did not explicitly distinguish between intentional groups and the broader, looser spread of network connections. In this more recent work, Wenger et al. make the distinction between communities (what we call “groups”) and networks. Because networks do not have a specific domain or shared enterprise, they differ from communities of practice in some important ways:

The learning value of a network derives from access to a rich web of information sources offering multiple perspectives and dialogues, responses to queries, and help from others—whether this access is initiated by the learner or by others. On the one hand, because of personal connections, networking enables access to learning resources to be very targeted—whether one sends an email query to a friend or decides to follow someone’s Twitter feed. On the other hand, because information flows can be picked up, interpreted, and propagated in unexpected ways, they traverse networks with a high level of spontaneity and unpredictability. This potential for spontaneous connections and serendipity—and the resulting potential for collective exploration without collective intention or design—is a key aspect of the value of networks for learning. (Wenger et al., 2011, p.12)

While communities/groups are concerned with building a shared identity and fostering trust and commitment, networks, if they can be said to be concerned with anything at all, are about fostering and optimizing connectivity. Because networks are emergent features of connections with others, this concept is far more blurred and hard to grasp than it is in the context of groups, especially as those who are part of a network may not even be able to see the network, let alone view or affect aspects of its structure. Nonetheless, Wenger et al. identify a wide range of indicators to identify value within networks and make tentative steps
toward identifying how such value may be reified through structured storytelling. This approach carries with it an underlying assumption that the networked learner is concerned with meaning-making in a constantly shifting, dynamic context. It is a process in which the creation of value is linked to the creation of content; the process of navigating a network and interacting with others in it is a process of learning in and of itself.

**Connectivism**

George Siemens coined the term *Connectivism*. In his 2006 book, *Knowing Knowledge*, he described it as “the integration of principles explored by chaos, network, and complexity and self-organization theories” (Siemens, 2006, p.30). Like Heutagogy, and drawing on the conceptual underpinnings of distributed cognition, actor-network theory, and communities of practice, connectivism assumes a context connected through pervasive networks that link not only individuals but also machines and resources as well. Siemens (2005) articulated eight oft-quoted principles of connectivism:

- Learning and knowledge rests in a diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known.
- Nurturing and maintaining connections is needed to facilitate continual learning.
- The ability to see connections between fields, ideas, and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality.

Connectivism shares many of the attributes of constructivism, notably in its valorization of diversity and a philosophical basis that knowledge is constructed in a social context. Like Heutagogy, Connectivism values capacity over what is currently known and proposes students learn how and what to learn and have input into this process.

Connectivism draws heavily from distributed cognition and actor-network theory in its view of learning in non-human appliances. This is about the traces
that we leave in our networked lives, the artifacts through which we build and share knowledge and create new ideas, the tools and objects we offload cognitive functions to and think with. From the first time humans scrawled signs and images on cave walls or in the dirt, they were offloading part of their intellect into external space. Like those who rail against Wikipedianism and the Googlization of society today, Socrates saw this as problematic, as Plato relates in *Phaedrus* on the subject of the invention of writing:

> The specific which you have discovered is an aid not to memory, but to reminiscence, and you give your disciples not truth, but only the semblance of truth; they will be hearers of many things and will have learned nothing; they will appear to be omniscient and will generally know nothing; they will be tiresome company, having the show of wisdom without the reality. (Plato, trans. 1993, pp. 87-88)

Notwithstanding these dangers, this offloading enables us not only to stand more easily on the shoulders of giants but also on the shoulders of our peers, and to enable them to stand on ours.

Connectivism also acknowledges the speed with which knowledge expands and changes in net-infused societies. By being connected to both other humans and knowledge resources, we retain currency and benefit from the diversity of ideas and cultures that abound. Through our awareness and maintenance of these connections, we become able to create new connections, resolve problems for ourselves and others, and thus become truly networked lifelong learners.

There are some aspects of Connectivism—the theory itself, rather than the family of theories—that we remain unconvinced by. Siemens and particularly Downes have taken it to be a complete theory of learning, following from connectionist views of psychological reality, in which networks like the Internet and our social networks of knowledge are directly analogous to connections that we make in our brains and, ultimately, the synapses of which they are comprised (Downes, 2008a). While there are some strong topological similarities between these networks, there are also strong topological similarities between them and the patterns of flu virus epidemics and song charts (Watts, 2003), but this does not make them qualitatively similar. Connectivism presents one of the most compelling theories of the networked era of education, but it is, as its authors are happy to admit, a work in progress that provides a blueprint for others to follow, rather than a bible that must be adhered to in every respect.
No single generation of learning has ever superseded the last. Like all technologies, learning technologies evolve by assembly (Arthur, 2009) and incorporate and extend what came before. One does not need to look far to discover plentiful examples of each generation, often coexisting in the same course or set of learning transactions.

Connectivism as a theory in itself, as opposed to a collection of related theories, has been criticized on many fronts. Some suggest that it is not a theory at all (Ireland, 2007) but the more substantive critiques mostly relate to its notable inefficiencies (Kop, 2011; Kop & Hill, 2008; Mackness, Mak, & Williams, 2010). The vast majority of people who start out taking explicitly Connectivist courses, typically run as MOOCs, fail to finish them. However, the concept of “finishing” is itself not entirely relevant to connectivist learning. Its explicit emphasis on emergence rather than planned learning means that it is hard to measure whether targets have been reached at all, much less with efficacy, and perhaps more disconcertingly, it is far from clear whether the resulting learning might have been more effectively or efficiently achieved in some other way. In response to these and other criticisms as well as opportunities afforded by new technologies, there has been an evolution toward a more holistic model that incorporates all earlier models of learning, including connectivist models. We have christened this the ‘holistic generation,’ in recognition of the fact that it encompasses all earlier models.

Holistic approaches to learning are agnostic as to method. Drawing from connectivist and older models, they valorize diversity and the socially distributed cognition afforded by the read-write Web and other publishing models, accepting that every learning experience is unique, and every learner’s needs are different. Connectivist approaches, for all their extensive reliance on networks of people engaging socially, are at heart focused on the individual—specifically, the individual’s learning. Holistic models embrace the fact that it is sometimes more important that a group learns, rather than an individual, especially in collectivist cultures (Potgieter et al., 2006). Holistic models recognize that, sometimes, guidance is what is most needed, that people can learn without direct engagement with others and, even that transmissive instructionist models of teaching have a place.

The current generation of large-scale MOOCs provide a good example of this. Courses from the likes of Coursera and Udacity tend to follow a highly instructivist model but, because of their size, spawn networks and study groups of learners who meet face-to-face, and through various social media such as Facebook,
to enhance and support one another using quite different and more connectivist approaches. To support diversity and maintain the right amount of coherence for any given learner, holistic approaches are, like connectivist methods, heavily reliant on technologies. In particular, they make use of tools that can aggregate the actions and behaviours of many people in order to help make sense of a topic for those that follow. Social and learning analytics, collaborative filters, recommender systems, reputation management tools, and social adaptation systems are used to counter the torrential flow of information and plethora of connections that characterize the connectivist process. We will discuss most of these in greater detail later in this book, but for now, note that one of the main features of such systems is that they use, directly or indirectly, the diverse knowledge and actions of a crowd.

**THEORY OF TRANSACTIONAL DISTANCE**

Beyond broad families of learning theories, the theory of transactional distance has been highly influential in distance learning teaching and research. It is a theory of instruction rather than learning, and it was developed within the specific context of distance education programming. Like activity theory, ANT, and complexity theory, it is a systems theory that looks at the interactions of agents and the effects that those interactions have on the behaviour of the system. As noted previously, social learning takes place in both formal and informal settings and in distance, classroom, and blended contexts. Nonetheless, it is perhaps most powerfully apparent when it operates beyond the limitations of time and space as a means of supporting distance education and distributed learning.

Moore (1993) attempted to develop a theoretical model that addresses both structured instructivist and dialogic social-constructivist models of distance education, and provides guidelines for creating mixtures of the two. Moore argues that the “distance” in “distance education” should be considered not in either geographic or temporal terms, but as a psychological and communications gulf between learner and teacher, measured on a continuum of structure and dialogue. The basic tenet of the theory is that a negative, “transactional distance” separates learners and instructors from one another and learners from the content they wish to master. This is not to suggest that high transactional distance necessarily leads to poor learning outcomes, but merely that there is greater transactional separation between learner and teacher.

Moore (1993) postulated that there are three dimensions of transactional distance—structure, dialogue, and autonomy. Structure refers to the degree of activity, learning outcome, media, and content selection that is prescribed by the instructor.
or delivery institution. Dialogue is the interaction between and among students and teachers, determined by factors such as the number of students in a given class, the degree of familiarity and cultural understanding among participants, the nature of learning activities engaged in, the immediacy of the technologies employed, and the sense of integration and identification with the educational institution, content, and other participants (Tinto, 1975). Autonomy is “the extent to which, in the teaching/learning relationship, it is the learner rather than the teacher who determines the goals, the learning experiences, and the evaluation decisions of the learning programme” (Moore, 1993, p. 28). Autonomy is dependent upon the self-discipline, existing knowledge, and self-motivation needed by learners to thrive in contexts that are not completely prescribed by external agents (teachers and rigid curriculum). As Candy (1991) observes, self-direction is a variable quantity that shifts in different contexts and is influenced heavily by external stimuli.

The educational designer has an opportunity to manipulate the structure and amount of dialogue in the learning sequence. High and low levels of each variable present educational opportunities in four quadrants, measured according to the degree of structure and dialogue found within them (Kawachi, 2009).

![Figure 2.3 Transactional distance quadrants (adapted from Kawachi, 2009).](image)

As illustrated in figure 2.3, there are many potential classic forms of formal and informal study that are associated with each of the quadrants. However, each learning context results in more or fewer restrictions on student freedoms, and each is associated with different degrees of scalability, speed of production, direct and indirect costs, and other variables. Rather than dispute the value of intense interaction as advocated by proponents of collaborative and cohort models of distance education (Garrison, 2000) or celebrating the autonomy offered by
individual study (Holmberg, 1986), Moore’s transactional distance theory (1993) helps us create models that trade off the advantages of both. Anderson has argued for an equivalency theory that postulates “deep and meaningful formal learning is supported as long as one of the three forms of interaction—student–teacher; student–student; student–content—is at a high level. The other two may be offered at minimal levels, or even eliminated, without degrading the educational experience” (2003, p.4). Thus, tension exists between developing formal learning programs that decrease transactional distance by increasing interaction and decreasing prescriptive activity, and providing access to educational experience that is of both high quality and affordable cost.

This accords with Moore’s own view (1993) that effective learning may occur whether transactional distance is high or low: structure or dialogue may be used effectively to improve learning. However, Saba and Shearer (1994) have demonstrated a system dependency that implies the more there is of one, the less there is of the other. As structure increases, it reduces the opportunities for dialogue, and as dialogue increases, it breaks up any intended structure. For example, a broadcast video lecture, one of the most highly structured forms of teaching, offers no opportunities at all for dialogue, at least while the lecture is playing. Conversely, a web meeting equivalent of the same lecture, if chat or audio are enabled for participants, allows participants to interrupt, ask questions, seek clarification, and change the pace or direction of the speaker. As a consequence, the event becomes less structured. At its most extreme, a dialogue between multiple participants may exhibit nothing but emergent structure.

Transactional Distance in Crowds

While Moore’s theory (1993) applies well within a traditional formal distance learning setting and has been verified and applied many times (e.g., Chen & Willits, 1998; Lowe, 2000; Stein, Wanstreet, Calvin, Overtoom, & Wheaton, 2005; Zhang, 2003), its applicability outside this setting, especially when social forms beyond the traditional dyadic or group modes of engagement are in play, is less clear. Transactional distance in social spaces that are not tightly controlled by a teacher is a complex phenomenon, whereby the teaching role may be distributed, anonymous, or emergent as a consequence of behaviours in a crowd, where the learner may be a contributor and active shaper of activities and content. We will be arguing that the concept applies differently under such circumstances and that, though the dynamic between an individual learner and teacher strictly obeys the
inverse relationship between structure and dialogue, there are ways to bypass the problem when the teaching role is embodied in a crowd.

Moore (1993) does not distinguish between the communications gulf and psychological distance in their roles as definers of transactional distance, but as we have explored the range of ways that transactional distance operates within our typology of social forms, we have come to realize that the two aspects, communication and psychological gulf, are entirely separable. In some forms and tools used within new social media, it is possible to be in close and constant two-way communication without significant psychological attachment, without closeness to another human being. Less commonly, there may be a sense of closeness without significant two-way communication. Both psychological connection and communication are important aspects of what creates distance. For minimal transactional distance, negotiable control, rich communication, and a feeling of closeness (in a psychological sense) are all important. Reducing any one of these increases transactional distance, and each variable is potentially independent of the others.

Transactional Control
Like author Anderson, author Dron (2007b) has also examined Moore’s theory of transactional distance (1993) and found equivalences: most notably, that the “distance” of which Moore speaks is actually composed of two distinct and largely independent variables. On the one hand, transactional distance is a mental phenomenon, a measure of the psychological and communications gulf between learner and teacher. On the other, it is a systems phenomenon that may be more precisely defined as an issue of control, which explains much of the negative correlation between dialogue and structure observed by Saba and Shearer. Both psychological/communication and control aspects are important, but they operate independently from each other.

From a systems perspective, when transactional distance is high, learner control over the learning transaction is lower and teacher control is higher, the teacher or teaching presence largely determining the learning trajectory. Through dialogue it is possible to negotiate control, and thus lower the transactional distance. The more dialogue there is, the more control is distributed among the participants. For example, learners can ask questions, seek clarification, express confusion, boredom, or interest, thus changing the path of the learning trajectory. The third dimension of Moore’s model (1993), autonomy, equates to the learner having control over his or her learning trajectory, requiring neither structure nor dialogue. Dron’s theory thus unifies the three variables identified by Moore in
transactional distance theory by treating all as part of a continuum of control, from autonomous learner control through negotiated control via dialogue, to teacher control through structure (Figure 2.4).

![Figure 2.4](image)

**Figure 2.4** The relationship between transactional control and transactional distance (adapted from Dron, 2007, p.32).

Most real-life learning transactions occur at some point along the continuum of complete learner control through to complete teacher control, and they seldom if ever occur at the extremes. Even in the most regulated transactions learners may choose to tune out, switch off, and will always reinterpret or construct their own understandings; conversely, even the most autonomous of learners will usually allow some of their control to be taken away by narratives provided by the author of a book, director of a video, or creator of a website.

**Cooperative Freedoms**

It is valuable to unpack the notion of control a little further, as it is of some significance in all forms of learning, especially in a social context. Garrison and Baynton (1987) provide the important insight that control is not simply a question of choice. In order to make effective learning choices, the learner needs *independence*—which, as Candy (1991) shows, is a highly situated and context-sensitive variable—*power* (the capacity to exercise that independence), and *support* (the tools, people, and processes needed to implement that power). However, for the idea to have any meaning at all, it is necessary to know some of the constraints
and factors over which learners may exercise control. If control is an important aspect of an educational transaction, we need to understand the nature of what can be controlled in a learning process. Morten Paulsen’s theory of cooperative freedom (2003) describes a range of possible freedoms that might be available to a learner in a formal learning setting. His hexagon of cooperative freedoms (see Figure 2.5) describes six dimensions:

- Place: freedom to choose where one learns
- Time: freedom to choose when one learns
- Pace: freedom to choose how fast or slow one learns
- Medium: freedom to choose the media used for learning
- Access: freedom to learn regardless of qualifications or extrinsic obstacles
- Content: freedom to choose what one learns

Figure 2.5 Paulsen’s model of cooperative freedoms (adapted from Paulsen, 2003).

Paulsen’s cooperative freedoms provide a fairly complete picture of freedoms in a formal, institutional learning context. However, there are gaps, and it does not describe well the different models of formal learning, such as those in connectivist transactions, or less formal learning environments. To Paulsen’s list of six dimensions, T. Anderson (2005) added the freedom of relationship, that describes the ability to choose with whom and how one engages with others, an essential freedom if we are concerned with social learning. Related to freedom of relationship but distinct from it is the freedom of disclosure: deciding to whom one discloses one’s communications. This is concerned with privacy and is of some significance to learners who may be fearful of displaying their ignorance. Disclosure is a more
pronounced problem when entering the public realm rather than a closed group, although the commonplace requirement for students to engage with others in a group can also greatly limit this freedom.

In addition to these freedoms, Dron (2007a) has observed that there is also a meta-freedom to choosing whether or not and when to choose: the freedom of delegation. To be in control of one’s learning, it is essential to be able to submit to the control of others when we do not ourselves have sufficient knowledge, experience, or time to decide what and how to learn next. Another freedom that is not quite addressed by Paulsen’s “medium” is the technology used to present content. There is a world of difference between text presented on a mobile phone and text presented on a tablet or large screen, even though the medium may be considered the same. It is useful and, from a learner’s perspective, valuable to distinguish between media and the technologies used to deliver them. We therefore add “technology” to the list of freedoms. We might use the word “tool” instead, but the popular term “technology” makes it more easily understood in this context.

While our newly added freedom of technology might be comfortably stretched to cover the pedagogies and processes of learning, it may also be valuable to consider the freedom of method as a separate category. This requires a little justification. There are many ways that method is inseparable from technology. Indeed, a full definition of any technology must include both the methods and any tools it may employ, and in some cases, the method is the technology. There are strong arguments suggesting that pedagogies, for example, should be treated as technologies (Dron, 2012). However, especially in a learning context, it remains valuable to think of methods separately, especially when we are talking about pedagogies, particularly as populist definitions of technologies tend to focus on the physical tools such as whiteboards, desks, cellphones, and computers, rather than what makes them into technologies. So, although we believe that any full definition of a technology must include both the tools of which it is comprised and the ways they are used, the two are often separable in popular understanding. One can, for instance, use the same tool in many different ways, employing different methods.

Of all Paulsen’s freedoms, “access” stands out as being beyond the potential control of an individual or teacher. Access may be denied, for example, due to a lack of qualifications, but can be equally due to limited experience and prior knowledge. This is not a matter of personal choice, or if it is, it is at an entirely different scale from the other freedoms, sometimes relating back to choices made years or even decades ago. Access is not only about prior learning, it also relates to the availability of technology and the ability to use it. However, these are both covered by other
freedoms—the freedom to choose an appropriate technology or medium, and the choice of method. Thus, while access is a very important issue, especially in formal learning, it is of a different kind and/or scale to the other freedoms and is not easily controlled by the learner; we therefore exclude it from the list.

This leads us to our own decagon of cooperative freedoms, extending and adapting those identified by Paulsen, illustrated in figure 2.6:

- Place: freedom to choose where one learns
- Time: freedom to choose when one learns
- Pace: freedom to choose how fast or slow one learns
- Medium: freedom to choose the media used for learning
- Content: freedom to choose what one learns, from what source
- Technology: freedom to choose the tools with which one learns
- Method: freedom to choose the approach and pattern of learning
- Relationship: freedom to choose with whom one learns and how to engage with them
- Delegation: freedom to choose whether and when to choose
- Disclosure: the freedom to decide what and to whom it is revealed

Figure 2.6 Decagon of cooperative freedoms (adapted from Paulsen, 2003).

Mirroring Moore’s theory of transaction distance, cooperative freedoms are, in many cases, inversely related to one another, though due to the number of freedoms under consideration and the ways they can interrelate, the relationships are more complex. Of particular note, many forms of social learning and freedoms
of relationship affect and are deeply affected by pace. If we are learning in direct
dialogue with others, then the pace of interaction is strongly related to the pace of
learning: we have to wait for responses, to work in synchronization with others.
Similarly, social interaction may place limits on the potential times and places that
learning transactions can occur, as well as the medium, technology, and method
used. Likewise, if constraints are placed on relationships, then this may affect free-
dom of disclosure: for example, if engagement is required as a classroom activity.
There is a constant and ever-shifting interplay between constraints and afford-
dances in any sequence of learning transactions, in which technologies, pedago-
gies, physical and temporal constraints, financial imperatives, prior learning, future
needs, methods, and media all help to determine the actual learning path that will
be most useful or practical.

Conclusion

Social learning mediated and enhanced on digital networks has much in common
with other models of learning, teaching, and associated instructional designs and
pedagogies. Ideas and learning activities can be extracted from these other con-
texts and applied effectively in networked contexts; thus, there is value in extract-
ing ideas and testing their efficacy in them.

In this chapter, however, we have focused on the main families of learning and
educational theories that we believe are most directly relevant to the emergent
context of networked learning. None of these are exclusive: the most rigidly
behaviourist methods of learning have a social context and application, and may
be found within learning trajectories that use social constructivist and connectiv-
ist models without negating the benefits of either. Connectivist learning often
blurs into social constructivist modes as part of the emergent whole, and trans-
actional distance provides a useful way to measure the varying quantities of con-
trol and social engagement at any point along the journey.