**Individual and Social Learning at a Distance: Ways and Means**

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**Abstract:** In this paper we revisit the major forms and structures that have been developed by educators and institutions to support both distance and campus based education. In addition to individual learning, some students, content and systems stress interaction specifically that between students and teachers, students and other students, and students and content. We then examine the ways in which education has been organized and specifically the types of social interactions and structures that support social learning. We look, in turn at groups, networks and sets and then demonstrate how collective resources and algorithms are creating new and very powerful ways to enhance the multiple forms of online learning.

Distance education has through its 150 or so years of evolution had an uneasy relationship with the ideals, requirements, and technologies of social interaction. From earliest prehistoric mimicry to learning from elders and apprentice masters, learning has always occurred in social contexts. These contexts are populated by three actors and their interactions create the stage on which learning occurs. Two of these actors are human- the teacher/master/leader and the student(s). The third actor is content, that takes many formats and is increasingly displayed and transmitted in digital formats ([Moore, 1989](#_ENREF_28)). Distance education is distinct from other forms primarily because the full range of explicit teaching behaviours are separated from the learning behaviours by time and/or space. Content and students have long involved learning at a distance as reading of books and other documents has been an option for millennia, but distance learning involving the active engagement of a teacher has only been possible in a formalisable manner since long distance communication became cheap and reliable.

Learning, in any domain and formal or informal context, is both a social and an individual process. At one level of study cognitions and mental schema are constructed uniquely in our individual brains. Yet we also know that cultures, language groups and those in close proximity (physically or virtually) share common and collaborative ways of communicating, creating and learning. Common linguistic and cultural skills, habits and techniques are used as foundations upon which new learning is constructed and shared. These social norms also pre-condition, filter and paradoxically both reveal and hide learning awareness and opportunity. Social learning is both the cause and effect of the intelligence of our species ([Wilson, 2012](#_ENREF_49)). Evolutionarily speaking, an increase in social intelligence results in and is subsequently caused by an increase in individual intelligence ([van Schaik & Burkart, 2011](#_ENREF_45)).

Formal higher education continued a stress on interactions with other human actors since medieval times. The vitae, or life, oral defense of ideas became the standard upon which scholarship was both assessed and transmitted ([Norton, 1909](#_ENREF_30)). Buildings, laws, systems, institutions, roles and a culture evolved to support this model of learning. Indeed, the notions of social learning became so conditioned in our way of thinking about learning, that it began to be used as a definition of learning or even of humans and their culture. For example Richerson and Boyd ([2005](#_ENREF_35)) define human culture as “information capable of affecting individuals’ behavior that they acquire from other members of their species through teaching, imitation, and other forms of social transmission. By information, we mean any kind of mental state, conscious or not, that is acquired or modified by social learning, and affects behavior” (p.6). Note the reference to social learning in this quotation which makes the claim that not only culture, but information more broadly is “acquired or modified” by social learning.

Given the critical and indispensible role attributed to social learning, it is perhaps no surprise that when models of education with different roles and understanding of learning appeared, they were often met with distrust and suspicion. Even today, education systems that move the formal interaction out of the classroom and remove the direct and real time interaction with teachers or with other students are sometimes considered “second class” or at least not as effective or engaging as those that are socially mediated ([Eamon, 1999](#_ENREF_10); [Noble, 1998](#_ENREF_29)). This despite over 20 years of research generally demonstrating “no significant difference” in learning outcomes between these modalities ([Russell, ND](#_ENREF_37)).

Even at the level of the individual, social interpretations effect and can impair or accelerate individual learning. As Sperber and Claidiere ([2008](#_ENREF_43)) explain “the learning process involves not just extraction but also interpretation of input information, and interpretation typically involves enrichment of the information interpreted.” As argued earlier, these very interpretations are the product of social interactions that have been adopted by the individual learner.

In an attempt at add a social component to the earliest university courses offered at a distance (in printed correspondence format), various mechanisms were put in place to add social-like enhancements. Typically, but not always, students were assigned to a teacher who could be reached by postal mail and later telephone. But as importantly, efforts were made to create content that was written in conversational (as opposed to didactic style), so as to engage the learner in a pseudo conversation. Borge Holberg ([2003](#_ENREF_17)) detailed the techniques for creating this type of guided interaction that included an informal conversational tone and techniques for reaching an ‘empathetic’ understanding of the distance student. Finally, distance educators began to notice and study vicarious interaction, taking the cues from social learning theorist Bandura ([1977](#_ENREF_3)) and measuring the affective perception, learning outcomes and persistence after exposure to a variety of vicarious interactions ([Kawachi, 2003](#_ENREF_20); [Lee, Dineen, McKendree, & Mayes, 1999](#_ENREF_22); [Sutton, 2001](#_ENREF_44)). However, the problem with all content until recently has been that it cannot respond, talk back, criticize or offer feedback. Content is almost always the product of a teacher/master/leader or of other students so, in most meaningful ways, learning and teaching are social from start to finish. What makes content different is that it does not play a full social and organizational role of a teacher. Early and ongoing uses of computers in education were used to attempt to redress that imbalance by allowing the computer to act as a surrogate for its programmer/teacher, providing a certain level of interaction that allowed content to become an active player in a kind of conversation. As anyone who has engaged with even the most sophisticated of artificial intelligences such as Apple’s Siri or Google Now, this kind of interaction is as yet a long way from offering the rich, creative responsiveness of a real human being. Though this may change in years to come, for now there appears to be no good replacement for the exact type of human-to-human interaction that we have evolved with. Having noted this, it raises the question if ALL types of learning require human interaction.

Although not wishing to denigrate the value of interaction or various types of pseudo interaction for some students, it is apparent from both surveys and use of optional interactive services that some students do not want, nor need these type of social interactions. Further, some students can and do succeed at formal distance study, with no human interaction ([Anderson, Poelhuber, & McKerlich, 2010](#_ENREF_2)).

**Interaction Equivalency (EQUiv) Theory**

In attempt to theorize and explain the widely different theoretical value placed on interaction by distance education scholars and the ambivalent views of students, we developed an interaction equivalency theory ([Anderson, 2002](#_ENREF_1); [Miyazoe & Anderson, 2010](#_ENREF_26)). The theory has two postulates:

1. 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.
2. High levels of more than one of these three modes will likely provide a more satisfying educational experience, although these experiences may not be as cost- or time effective as less interactive learning sequences

Subsequent research has generally tended to support the Equiv theory (see references and summaries at <http://equivalencytheorem.info/>) and we believe that the increasing cost of education demonstrates the value of offering minimalist learning alternatives that are most cost effective. The recent popularity of xMOOCs with significant substitution of traditional student-teacher and student-student interaction by recorded video is evidence of the demand for and efficiency of this type of education. Indeed, we have argued that the capacity for students to select their own sources of student-content interaction from open educational resources, educational videos and MOOCs will provide a much needed access to affordable education for many deprived of these opportunities ([Miyazoe & Anderson, in press](#_ENREF_27)).

**Learning with Others**

Despite the fact that some students can learn effectively and efficiently without direct student-student or student-teacher interaction, there is little doubt that other students thrive when actively engaged with peers and teachers. The distance education literature has demonstrated the value of these interactions in reducing drop out ([Rovai, 2003](#_ENREF_36)), increasing engagement ([Laurillard, 2000](#_ENREF_21)), enhancing “study pleasure and motivation” ([Holmberg, 1989](#_ENREF_16)) and other indicators of ‘good practice’ ([Chickering & Gamson, 1987](#_ENREF_4)). Ted Panitz ([1997](#_ENREF_33)) details over 67 such benefits from engaging in collective learning Panitz argues that collaborating reduces anxiety, builds self-esteem, enhances student satisfaction and fosters positive relationships among students and faculty. Social interaction also allows for emergence and the benefits of both cultural and intellectual learning by opening new opportunities for insights and learning not otherwise available to individual learners which Kauffman ([2000](#_ENREF_19)) describes as increasing adjacent possibilities ([Kauffman, 2000](#_ENREF_19)). Finally, social interaction can be used to enhance social capital building. Generally the possession of social capital, like other forms of capital, allows individuals and groups to accomplish their goals because they can draw on the resources, support and encouragement of these resources – in this case human beings. Sandefur & Laumann ([1988](#_ENREF_39)) argue that social capital confers three major benefits upon its owners. These are information, influence and control, and social solidarity.

As distance educators, we have long been aware of the effects of context on the extent, efficiency and effectiveness of human interactions in the learning process. From earliest days of mediated interaction that focused on the negative effect of “clues filtered out” to claims of hyper personal communication ([Walther, 1996](#_ENREF_47)) that exceeds communication available face-to-face that take places in immersive or other rich mediated contexts. Context does effect interaction however, we also have learned that it is at least as much if not more an effect of the learning activities and design as the media that stimulates or impairs quality learning interactions. We thus turn our attention to the ways in which distance education online may be socially organized.

**Groups, Nets and Sets**

In our most recent work ([Dron & Anderson, in press](#_ENREF_8)) we have been describing and developing systems that differentiate between learning that takes place in three different social aggregations (nets, sets and groups). We also explore the notion of collectives, emergent entities that result from aggregated social activities in one or more of the three social aggregations.

These three basic forms of online social learning are illustrated, with typical, though not exclusive examples, including those of their intersectons, in the Venn diagram in

Figure 1. Nets, Sets and Groups

**Learning in groups:**

Group learning emerged early in our evolutionary history and is the most common educational form that predominates in both classrooms and online. In a group, members come to know and rely on each other thus enhancing their learning opportunities through collaboration, cooperation and feedback. Group based learning stimulates deep awareness of each other and builds learning opportunities that rely upon and build trust and commitment among group members. Teachers comfortably assume leadership roles in formal learning groups and a variety of effective learning designs and activities have been developed to maximize learning that occurs in the group. Group formation and growth usually goes through normal stages of growth and well known models such as Tuckman & Jensen's [(1977](#_ENREF_27)) five-stage model of forming, storming, norming, performing, and adjourning have been identified in classrooms and online ([Salmon, 2000](#_ENREF_38)). In distance education the familiar community of inquiry model ([Garrison, Anderson, & Archer, 2000](#_ENREF_12)) with its focus on social, cognitive and teaching presence has been used to both study and improve group based learning.

However groups are not without problems when used as a context for distance education. Perhaps most obviously, groups limit access. Groups function most effectively in paced systems that limit speed of learning to an idealized middle speed, that doubtlessly bores some students and moves too quickly for others. Group formation is also enhanced through synchronous formats ([Somenarain, Akkaraju, & Gharbaran, 2010](#_ENREF_42)) that restrict access to those in certain localities in campus education systems and to those who can conveniently share temporal availability in distance contexts. Groups also introduce power inequalities, notably between teacher and students, but also in other ways as noted in studies of the ‘hidden curriculum’ ([Margolis, 2001](#_ENREF_23)). These can result in student dependencies on teacher direction that may inhibit growth of self-directed learning.

 Thus, groups are used as powerful tools for social learning, but like all tools they can be used effectively or ineffectively and have both planned and unintended effects on both students and teachers.

**Learning in Networks**

A network is a social aggregation defined by individual nodes and connections (both weak and strong) among players in a social context. Networks cannot be designed like groups, but they can be nurtured and shaped. Software systems that provide support for social, business and learning networks have become very popular in recent times and they used for many functions in entertainment, commerce and education. Further, researching education using a lens of network analysis has proven to be a fruitful way of both diagnosing and designing learning activities - notably networks of practice ([Wenger, Trayner, & Laat, 2011](#_ENREF_48)) and cMOOCs ([Siemens, 2012](#_ENREF_41)). In education, networked pedagogies (notably Connectivism ([Siemens, 2005](#_ENREF_40)), complexity ([Davis & Sumara, 2006](#_ENREF_5)), heutagogy ([Hase & Kenyon, 2000](#_ENREF_15)) have been developed that stress the value of building and nurturing networked connections to both people and learning resources.

Unlike groups, learning networks are loose, often transitory formations that have capacity to extend beyond the familiar paced cohort of learners and teacher. Learning networks stress student creation and curation of learning objects that are made accessible to other learners both within and outside of the network. Due to the capacity to open themselves to learners and learning beyond the closed group, networks offer greater opportunity for social building and engagement with others outside the student’s known set of friends and colleagues.

Tools for learning networks often share suites of web 2.0 tools such as wikis, blogs, photo albums, social bookmarking and recommendation systems. Educators have used both open and closed network tools that are hosted “in the cloud” Facebook, Linked and Ning and institutionally hosted systems such as Elgg, BuddyPress and Mahara. Because of the openness inherent in networks, they are often harder to integrate within the normally closed and secure institutional information technology systems. They are undesigned and instead have emergent forms that may often be at odds with the intentions of those who design systems for formal learning that rely on process and structure. Finally the capacity for exposure of artifact and learning raises issues of privacy, persistence and inadvertent disclosure.

**Learning in Sets**

Likely the least well-known social learning aggregation which we have been developing is learning sets. Sets are a social form are made up of people with shared attributes. Sets in learning are people who share an interest and/or expertise in a topic or a theme. Although sets may evolve into networks or even groups, members of a set do not share social interactions or develop relationships beyond those developed by contributing or building a common set. The classic example of a learning set is a WikiPedia article that may benefit form the contributions of a set of numerous people who do not necessarily have anything in common or connections, beyond an interest in the article topic. Recently set tools have been developed such as Learnist and Pinterest that provide an easy way for individuals to communicate and share their set interest and normally they invite others to join or contribute to the set artifacts. It is possible (and quite likely) that each of us is a member of a set that we may not have consciously joined nor even be aware of. However, learning activities can be created that encourage and incent students to explore their interests and discover sets and set resources that further their learning.

Learning sets can be used for achieving particular learning outcomes or for exploration of emergent or serendipitous discovery. When hosted (as they usually are) on the open net sets can be very useful for exploring cultural and political differences amongst learners. Since there is no obligation for long term commitment or, often, even for identity disclosure, sets can be very used in safe ways without fear of predators or invasive activity. Conversely, the lack of accountability can also make it more likely that contributors will be inept or malicious, which can make it difficult to identify valuable knowledge in a potential sea of misinformation.

We are early in the discovery of the most effect ways to use sets in distance learning, but providing tools for students to search for, extract knowledge from, develop their own and contribute to sets curated by others can result in highly effective learning ([Mihailidis & Cohen, 2013](#_ENREF_25)).

**Collective enhancements to nets, sets and groups**

Most set-based, many net-based and a few group-based systems enhance the many-to-many communication opportunities they provide with many-to-one features that we call collectives ([Dron & Anderson, 2007](#_ENREF_7)). Collectives combine the behaviours of many individuals to act in some ways like an individual teacher, recommending resources, filtering them, ranking them, transforming them, identifying things that are valuable or providing a measure of a person’s or post’s reputation. Arguably the most successful individual learning technology system ever created, Google Search, for example, is a collective. Amongst other things, it uses a PageRank algorithm that, from a candidate list of pages containing relevant keywords, ranks them according to the number of other relevant pages linking to them and the weightings of those pages. Those pages gain or lose weighting according to the number of links into them and the weightings of pages providing those links, in a recursive chain that, when summed, results in an overall ranking for a given search result ([Page, Brin, Motwani, & Winograd, 1999](#_ENREF_31)). As a result, higher ranked pages shown at the top of the list are more likely to be relevant, reliable and useful to the searcher, because of the implicit recommendations of others. This is much the same idea as the process used to rank researchers through citations through systems such as h-index ([Harzing, 2010](#_ENREF_14)). There are many other approaches that rely on implicit or explicit measures of approval, such as book or movie recommendations by collaborative filtering systems like Amazon or Netflix, ratings of answers provided to questions in sites like Reddit or StackOverload, tag clouds that show popular tags in larger fonts, or reputations of posters on Slashdot or sellers on eBay. In some cases, people alone can perform the processing needed. The soft security of wikis relies on the fact that it is easier to undo malicious edits than to make them, and most people are altruistic, so inaccuracies or falsehoods tend to disappear almost as soon as they are made on a large wiki site like Wikipedia or Wikia, as an averaging effect of many small edits. Similarly, patterns and methods that work can spread mimetically through a wiki as people copy techniques that work, resembling the ways that ant trails or termite mounds form in nature, a process known as stigmergy ([Grassé, 1959](#_ENREF_13)). Often, a collective emerges from a combination of both human and computer processing. Tag clouds, for instance, show relevant topics as a weighted list, but the decision about which tag to choose or use is made my humans, applying their own rules based on stigmergic signals (normally shown through font size) to make decisions. While great success in a teaching role can be achieved by non-specialist collectives like Google Search or Wikipedia, mainly due to the huge number of contributors that iron out any outliers, a number of specialist educational tools deliberately include collective functionality (e.g. ([Drachsler, 2009](#_ENREF_6); [Dron, Mitchell, Boyne, & Siviter, 2000](#_ENREF_9); [Farzan & Brusilovsky, 2005](#_ENREF_11); [Vassileva, 2004](#_ENREF_46)))

Collectives have particular value for people learning in sets, helping to overcome the innate lack of trust engendered through anonymity and lack of social connection. The combined activities and interactions of many people can often provide more reliable recommendations and filtering than even an expert individual teacher ([Page, 2008](#_ENREF_32)) albeit without the personal connection of a real human being. Some collectives can supply not just filtering and recommendation but discovery – crowd-sourced approaches to creating resources such as those used on Github, for example, leverage crowd creativity as well as crowd wisdom to produce better, higher quality output than traditional teams or individuals can achieve alone. Most social networking tools make extensive use of collectives to identify individuals that members may know, thus helping to build learning networks, if that is what the network’s purpose is deemed by its makers or its users to be. There are, currently, some limits to the extent to which a collective can take the place of an expert teacher. While there have been some interesting attempts to provide sequences of activities in constrained settings (e.g. [Hummel et al., 2007](#_ENREF_18)), collectives tend to be poor at planning paths and curricula: using most collectives tends to be like riding a wave, responding to whatever the collective decides would next be useful. Collectives are not even close to providing even a rough simulacrum of social presence: though composed of the actions of people, they are not human and do not behave like humans.

Collectives are susceptible to a range of problems. The Matthew Effect, in which the rich get richer while the poor get poorer, can magnify errors or propagate sub-optimal practices or resources ([Merton, 1968](#_ENREF_24)). Similarly, filter bubbles that result from systems shaping themselves to perceived user needs, as can be found in collaborative filtering systems ([Pariser, 2011](#_ENREF_34)), can be particularly harmful for learners, whose needs, by definition, constantly change. Concerted attack, such as edit wars on Wikipedia or the effects of Google Bombing (concerted efforts by large sets or networks of individuals to influence results) on Google search, can reduce trust. Finally, collectives are only as smart as the combination of algorithms, human or machine, that they employ. Collective intelligence is not directly proportional to the intelligence of its parts and, in many cases, can display a lot less intelligence. It is beyond the scope of this paper to discuss the technical solutions to these problems but, suffice to say, it is easy to make use of crowd wisdom but even easier to suffer from mob stupidity. Despite this, as the success of Google, Wikipedia, Q&A sites like Slashdot or Stackoverload, recommenders of books like Amazon or educational paper recommenders like academia.edu show, collectives can be powerful tools for educators and learners alike.

**Athabasca Landing**

 We end this article with a description of an open source online learning system that serves as a testbed and idea generator for the learning ideas developed earlier. For the past three years we have been developing an institutionally hosted networking system based on the open source Elgg platform (elgg.org). This system is used both to support classes and more widely spread ‘learning beyond the course’. In addition the system is used to support user controlled network building by students, faculty and staff at our universities and to make serendipitous discoveries of useful shared learning content and people with whom to learn more likely. It supports all four of the entities we have discussed here: groups, nets, sets and collectives. This makes it a very flexible tool but highlights how these modes differ in sharp relief. The effect is most obvious to those who engage with one of the hundreds of groups on the site, especially when it is used in formal teaching. Unlike the self-contained groups on hierarchically organized sites like most learning management systems (LMSs), these groups are permeable, a click away from networks and sets that cross over and extend beyond them. Furthermore, collective tools like tag clouds and recommendations may often impose a different kind of structure than that which may have been planned by group owners and teachers. Although full access to our system (known as Athabasca Landing) is restricted to the members of our wider university community, we welcome visitors to see those portions of the network that users allow to be shown publically. The URL for the Landing is landing.athabascau.ca.

**Conclusion**

In this paper we have attempted to both survey and explicate the ways in which both individual and a variety of forms of social learning can be developed and enhanced in an online, distance education context. We obviously have our personal preferences and our institutions have developed favoured forms of teaching and learning. However, as distance educators, we have always been motivated by a drive to expand opportunity. For most types of learning we can take it for granted that the geographic bounds that limit access to on campus have largely been removed through distance education. What remains are ongoing challenges and emerging possibilities as we build tools, pedagogies and learning activities that expand access to different modes of learning – and especially those that explore the many facets of social learning.

 Learning does not have to be social to be effective. But providing the choice for students and teachers to create and modify the types and the quantities of individual, group, set and net based learning and to effectively use collective tools and knowledge to enhance each mode of learning and teaching is both our vision for tomorrow’s distance education and our mission for today. [[1]](#footnote-2)

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1. This paper is a small subset of the theories, arguments, and examples we present in Dron, J. and Anderson, T. (in press). Teaching crowds: the role of social media in distance learning Edmonton, Canada, Athabasca University Press. This book will be available in both print and for open access downloading in the spring 2014. [↑](#footnote-ref-2)