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AN INVESTIGATION OF TEACHING PRESENCE ON ATHABASCA UNIVERSITY'S E-LEARNING COMMONS: THE LANDING

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The future of learning.

Approval of Dissertation

The undersigned certify that they have read the dissertation entitled

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Dedication

To my husband, Jim, who has encouraged me, endured endless hours of writing, rewriting on land, sea, and air, numerous evenings waiting for me to finish seminars, and hour upon hour of pedagogical geek talk.

With all my love.

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Abstract

This dissertation investigated teaching presence on Athabasca University's e-learning commons: The Landing. As a qualitative, exploratory research study, it investigated teaching presence as it is defined in the community of inquiry framework using the transcript assessment tool developed by Anderson, Rourke, Garrison, and Archer (2001). Booth and Hultén's (2003) taxonomy of discussion indicators was also used to investigate the nature and depth of discussion on the Landing and shed light on how teaching presence prompted learning. Finally, the study also investigated the Landing's value to stakeholders using Wenger, Trayner, and de Laat's (2011) conceptual framework for assessing value creation in communities and networks. The investigation of teaching presence on the Landing, the depth of discussion, and the creation of learning value as measured in value creation stories established a preliminary indication of the value the Landing offers to students, staff, and faculty at Athabasca University. While this study was limited to the examination of two self-paced courses on one e-learning commons, it added to the very limited literature measuring teaching presence in self-paced university courses supported by such an environment and shed light on the teaching affordances and attendant value e-learning commons can offer teaching and learning organizations. The investigation revealed that the instructional design and organization of the courses created a cooperative, dialogue, not discussion-based learning environment. It also attempted to code educational groups, nets, and sets within the environment and showed some evidence of a correlation between instructional design and organization and students feeling a sense of being a member of a supportive community. As a result, a new model for dialogue-based, cooperative e-learning is proposed.

Keywords: community of inquiry, teaching presence, value creation stories, e-learning commons, the Landing, dialogue-based cooperative e-learning

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Chapter 1. Introduction to the Study

Context of the Investigation

Athabasca University, Canada's Open University, was founded in 1970 as a single mode delivery, distance education institution. At the time, courses used a "three p delivery model": paper, pencil, and post, developed and delivered using an industrial model (Peters, 1988). With expansion, and advances in technology, the university moved to online delivery to utilize new technological affordances and to accommodate student desire for convenient, timely course access. Concurrently, theoretical focus shifted from an emphasis on efficient delivery to concerns about the nature and quality of transactions between and among teachers and students (Garrison, 2000).

Despite the change to a learning management system, Moodle, in many cases, pedagogy has not changed, and online technology is used only to deliver course material and retrieve and manage assignments and assessments (Dron and Anderson, 2014). Approximately 65% of the university's 40,000 plus students are in continuous enrollment, self-paced, undergraduate programs (Athabasca University, 2015). While this maximizes learner control over time and place and allows access to a university education that many could not otherwise obtain, it also means that these students study in relative isolation without the support of classmates. Although students start and complete courses at their convenience, there are likely students in many courses who are in the same place in a given course and who may be able and willing to share tools, work cooperatively and provide collegial support to each other but are unknown to their fellow students.

In a 2010 study of this undergraduate, self-paced population at Athabasca University Anderson, Poelhuber, and McKerlich found that 70% of students surveyed were interested in discussions with other students. Table 1 shows the range of activities and corresponding activities in which students expressed interest.

To alleviate this potential for isolation, a set of social and networking tools was developed. The suite of tools was named Athabasca Landing, or the Landing, in recognition of the historical site of the University - Athabasca Landing- a place where

Table 1

Interest in working with others on specific collaborative activities	*Total (n = 882)*
Discussions with other students	70%
Sharing internet resources	44%
Working on a project	40%
Studying for exams	38%
Doing an assignment or coursework	34%
Other activities	20%
Writing a paper	18%
Creating web pages or resources	18%

Interest in Collaboration

Note. From "Self-Paced Learners Meet Social Software: An exploration of learners' Attitudes, expectations and experience," by T. Anderson, B. Poelhuber & R. McKerlich, 2010, Online Journal of Distance Education Administration, 13(3), paragraph 32. Reprinted with permission.

gold seekers stopped to gather supplies and knowledge before continuing their journey to the Yukon gold fields, and the idea that the site could be used as a landing place for staff and students – providing a place to take advantage of others' knowledge and experience before continuing their journey. It provides an online place where the learning of previous students and the possibility of interaction with concurrent students and staff members is available. It uses the affordances of a connectivist approach, in particular, the ability to access previous students' work as a scaffold for current student's learning and for students and staff to make connections and/or form networks with others using the site.

The lack of a physical site where students meet teachers and other students means that all communications between teachers and students require some form of mediation. The Landing's design lets teachers and students benefit from the affordances that Web 2.0 applications, in particular the Elgg framework with its design possibilities, offer to learners, faculty and staff. It gives the Landing a public face, much like the exterior of buildings on a physical campus, available to anyone who visits the site (landing.athabascau.ca/). The public can explore and view the tools and spaces it offers including an online tutorial called Getting to Know the Landing. This item, created by the site's administrators, describes the Landing as similar to

Facebook, Twitter, and Ning - with social tools like short messages, blogs, micro-blogs, pictures, and wikis. The public page also displays recent posts and offers a sampling of random public posts from previous months.

In addition to this public face, students, staff, and invited guests can log in to see the interior of the Landing, which like a physical campus, includes individuals' private spaces for organizing information, file storage, and learning activities such as discussions, conducting polls, and other common affordances of social networking sites. One of the prominent features of the interior of the Landing is the ability to control privacy at a very fine level of granularity. Content is potentially visible to anyone with access to the Internet (including search engines). However, each piece of contributed content can be limited to viewing, and comments by members of the Athabasca community (the default), a group, an individual, or the author only. This gives a great degree of control over the visibility and shared use of an individual's contributions. Groups also have the ability to control information distribution due to the default group setting allowing all group members to view and comment upon content submitted by group members.

Freedom from temporal and physical constraints afforded by distance education delivery is countered by a lack of boundaries that forces students to create their own spaces to separate their daily face-to-face life from their virtual educational life. The Landing can help create these boundaries by providing physical signs that help create a learning space to support their study. The act of logging on to the Landing, reading posts on the Wire (a Twitter like application), and reacting to, or interacting with the posts, puts a student in an educational space similar to the experience of a student on a brick and mortar campus who hears and converses with others in a face-to-face setting. Similarly, it mirrors some of the now familiar context of cohort based online delivery in that student study groups, cooperative activities and informal support now become possible. The isolation of working alone in a self-paced course without the benefit of classmates and university staff to share the experience, a factor in higher attrition in independent study (Rovai, and Downey, 2010; Rovai, 2003; Angelino, Williams, and Natvig, 2007), may be mitigated by the affordances of the Landing.

Athabasca University's Landing's complexity offers many forms of social contact. Its very flat organizational structure allows each member (from University president to a new undergraduate student) the same capability to create groups, post, vote, recommend and annotate for any non-commercial purposes they choose. Since its conception, the over 8,000 individuals

who have established accounts have used it for a wide variety of administrative and social functions, entertainment and both formal and informal learning.

The design shifts emphasis from structure to transaction to fulfill its purpose of providing spaces like those in brick and mortar campuses (T. Anderson, personal communication, December 14, 2012) where there is "a rich diversity of . . . non-formal and informal interactions in a variety of spaces from cafés, to lecture theatres, to offices, to smokers' areas and park benches" (Dron, 2009). Connectivism with its requirement for social artifacts and networking (Siemens, 2005) potentially allows for the creation and use of networks (human and non-human linked resources) to access information that is held in nodes beyond the student's formal learning context. Such learning in a connectivist model is current and flexible and is new to teachers' toolkits potentially influencing the development and even the nature of teacher presence.

The Landing was not designed specifically to be a teaching site, but it is used to deliver a limited number of self-paced undergraduate courses and in this capacity is used for teaching. This study will investigate the teaching presence in two self-paced, undergraduate courses on the Landing and will seek to determine if this teaching presence provides value for the university and for the students in these classes

Conceptual lens. Students in self-paced undergraduate courses at Athabasca University enroll in courses (beginning monthly) whenever and wherever their life-style/work situations allow, taking advantage of distance education's affordance of anywhere, anytime education. The isolation that has traditionally characterized distance education leaves students unable to take advantage of discussion, sharing and networking with classmates. The Landing was designed to mitigate this disadvantage by allowing the opportunity to access other students and traces of previous students' work to support their own learning efforts. This affordance allows potential benefit from interaction with other students within a community of inquiry.

The Community of Inquiry (COI) framework has been shown to be successful in allowing researchers to identify and describe the actions of the participants in both distance and blended courses delivered using a variety of media (McKerlich, 2011; Shea, 2006; Shea, 2003). Teaching presence defined by Anderson et al. (2001) as: " the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and

educationally worthwhile learning outcomes", is one of the three critical components of the Community Inquiry framework that has been examined and used as both a conceptual guide and methodological base for hundreds of studies (Anderson, et al., 2001; Garrison, Anderson, & Archer, 2010; Gorsky & Blau, 2009; Shea, et al., 2003). Teaching presence in self-paced undergraduate courses on the Landing has not yet been investigated.

An investigation of teaching presence in these courses promises two useful research tracks. First, it will add to the knowledge of where and how teaching presence occurs in self-paced, undergraduate computer mediated distance education courses, contributing to the body of work that describes teaching in this rather unique context. Anderson et al.'s (2001) teaching presence indicators will provide the framework for determining the existence and nature of teaching. The Landing's design based on groups, nets, and sets may provide new environments for teaching. Information about where teaching occurs and what it looks like (if it is there) can begin the process of giving teachers insights into the possibilities the Landing can provide for teaching presence.

The Landing environment allows for new social forms for learners. Dron and Anderson (2014) describe self-paced undergraduate courses on the Landing as tribal groups with some of the characteristics of groups and some characteristics of sets. Teaching presence has been examined in computer-mediated groups. Teaching in networks has been studied (Booth & Hultén, 2003; de Laat & Lally, 2003; Pilkington & Walker, 2003), although it has not been examined from a teaching presence perspective.

The investigation used the taxonomy of discussion indicators developed by Booth and Hultén (2003) to investigate the existence and nature of discussion to determine if teaching actions include prompting reflective and learning actions. Determining where teaching presence exists within group, net and set environments, if at all, adds to the body of research addressing the use of social networking tools for teaching. While the courses under investigation are educational groups, there are nets and sets within this larger group, supporting student learning. The effect on presence and how these environments affect the development of community is part of the focus of this investigation. As the existence of groups, nets, and sets on the Landing has not been studied until now, their existence is newly confirmed.

The Landing was designed to support all three forms of interaction: net, set, and group activity. Group activity consists of social activities of a closed and time limited nature amongst

participants with a collective sense of belonging and membership in the group. Thus, interactions between teacher and student are evident. There is also student to student interaction in which students clarify points or teach other students. This net activity is based on loose and extended interactions that could exist beyond the confines of the course group. It has the advantage of weak links that can serve to invigorate activity within the course group by introducing new ideas or points of view. Set activity is based on a common interest and as such focuses on interests encompassed by course topics, independent of the social interactions that characterize group activities. From a theoretical point of view, all three forms could be evident in the courses. Teaching presence is affected by a mix of the social forms: groups, nets, and sets. The soft design of the Landing supports a give and take of social forms affected by learning designs and activities as teaching presence affects social forms.

The development of groups, nets, and sets depends on the intentions of the facilitator. She could purposely encourage the use of these social forms to enhance the learning experience of the students. Conversely, an instructor who is unaware of these social forms could unintentionally discourage the use of these forms by not acknowledging or giving credence to knowledge obtained through participation in nets and sets particularly.

The group form is the traditional form of learning groups and is the social group that has been the baseline for teaching presence research. In courses on the Landing, the group form is a particular type of aggregation similar to classroom based formal education groups, with some significant difference. This group has no common start date, as students begin courses monthly, and so students in a given course are rarely at the same place in a course at any one time. This could have the effect of causing the facilitator to repeat teaching actions many more times that they would in a traditional group form. This consequence was addressed in course design methods, and the strategy: using the medium effectively. The course design affords the possibility of other students, who are farther on in the course, to take the role of instructor and answer their colleagues' questions.

The group format is well suited to the indicators for facilitating discourse and direct instruction, as these indicators were first formalized in group settings. Interactions within the educational group form would likely be less vigorous than in a traditional group for computer-mediated conferencing due to the distribution of students throughout the course timeframe. Further neither course studied has assessment marks awarded for participation in class

discussion although both courses listed posting information and
showing evidence of having helped fellow students as learning outcomes.

Nets or networks could have the effect of magnifying the learning impact in a course by using the strength of weak ties (Granovetter, 1973) to enhance the knowledge distributed among the course participants (including the facilitator). Granovetter defines the strength of a tie as "a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie". (p. 1361) Weak ties, then involve little time, emotional intensity, intimacy, and reciprocal services and yet can invigorate learning and add new perspectives to the learning environment, increasing the direct instruction indicator: injecting knowledge from different sources. It was thought it could increase the facilitating discourse indicator of prompting discussion, identifying areas of agreement/disagreement, and seeking to reach consensus/understanding, as well as the direct instruction indicator of diagnosing misconceptions. The presence of network activity within the course environment can increase specific teaching presences resulting from the instructional design and organization of the course.

Sets, using discourse analysis alone, are less easily identifiable. Members of sets are unaware of others in the same set, so do not recognize their participation. The common interest that people share when deciding to study a particular topic makes them members of a set, but, this membership is rarely expressed. Sets' influence has not been studied extensively and yet they have potential to be used by teachers to add learning value for students. The use of sets in a Landing course begins with instructional design and organization indicators: designing methods and utilizing the medium effectively and the facilitating discourse indicator: setting a climate for learning. Teacher awareness of sets and their characteristics and the acceptance of the knowledge they can hold give legitimacy to them as a possible source of information that can be examined against information from more traditional sources. Participants (albeit often anonymous) can be drawn from beyond course boundaries, like participants outside the course boundaries. Dialogue resulting from interactions on networks or sets can introduce new knowledge and viewpoints, possibly challenging course content and approaches to learning. Sets pose a challenge to both instructors and students in that knowledge they provide can be difficult to verify and attribute to a single source.

Booth and Hultén (2003), as discussed in greater detail below, have shown that teacher

intervention is necessary with some discussion groups to move students from data collection to learning. Both these patterns are different in groups where networks and sets are recognized as legitimate, social forms. This study examines the existence of educational groups, nets, and sets and opens the door for detailed analysis of how these social forms influence community and interaction patterns.

The second research track addresses an administrative concern. The study investigates how the Landing adds value to the university by potentially providing a space where teaching presence can flourish. In a time when program choices must be made based on value returned, a measure of value can aid in decision-making processes. In this light, the study looks at the implications for teacher time, necessary skills and new learning required to operate effectively in this context. The combination of transcript analysis of indicators of teaching presence on the Landing, and the use of the taxonomy of discussion indicators, and value creation stories to show how teaching presence adds value to the organization, creates information that will contribute to both academic and administrative bodies of knowledge.

Often studying in a computer-mediated course is like being teleported into class. The student goes immediately from her environment into the computer-mediated classroom without the social interactions and physical signals that have traditionally accompanied academic study. Students and staff do not have the physical, temporal, and psychological boundaries that allow brick and mortar institutions to provide sanctuary from day to day concerns through physical architecture and organizational culture. This problem is compounded in self-paced instructional formats by the absence of social interaction and the resulting support of classmates and staff and is addressed using the frameworks discussed below.

While the initial structure of the Landing makes use of social networking affordances and the concepts of spaces and control (Dron, 2007a; Dron, and Anderson, 2009a), the addition of group and set tools such as the Wire and tag clouds has prompted growth into a system that extends beyond networks (Dron, & Anderson, 2014) and includes the potential affordances of connectivism (Anderson & Dron, 2011; Downes, 2008; Siemens, 2005). This investigation of teaching presence is based on the community of inquiry framework (Garrison, Anderson, & Archer, 1999) and Anderson, et al.'s (2001) subsequent work on a conceptual framework and practical methodology for investigating teacher presence in a community of inquiry. Booth and Hultén's (2003) taxonomy of discussion indicators aided the investigation into the nature and

depth of discussion on the Landing. The taxonomy uses verbs to identify at which of four stages of discussion a group is working. Booth and Hultén (2003) found that those groups able to move to a reflective process showed learning by the end of the series of course discussions. The investigation of teaching presence and its relationship to discussion sheds light on teaching presence's influence in moving students to learning on the Landing. Wenger, Trayner, and de Laat's (2011) conceptual framework based on value creation stories for community of practice adds both a theoretical basis and methodology for examining teaching presence's value for the Landing as experienced by teachers and students themselves.

The use of these frameworks grounds the investigation in the pragmatic tradition of Pierce (1877), Dewey (1897, 1916), and the community of inquiry model. The Landing was conceived as an intervention to allow for the use of Web 2.0 affordances and the affordances of connectivism to possibly alleviate isolation by responding to student interest in greater opportunities for discussion and to possibly support higher completion rates. The third step of Booth and Hultén's (2003) taxonomy of discussion indicators reflect a pragmatic approach to measuring learners' progress to new knowledge. Value creation stories are a means of measuring teaching presence's value for individuals and the university as an organization and as such are an instrument by which participants' experience of learning value realized reveal the nature of teaching presence on the Landing.

Research questions. Research questions prepare the way for fieldwork, an anachronism perhaps for researching an e-learning commons but applicable none-the-less. These questions gave direction to the work of observing teachers and students in "their territory . . . their hangouts," (Bogdan, & Biklen, 2007). The primary question in this investigation was what does the Landing offer students, staff, and the university as an organization. While this is a valid question, it does not afford the specificity necessary to learn what happens on the Landing. In order to discover what the Landing offers, teaching opportunities were examined by investigating the nature of teaching presence on the Landing.

Specifically, the research questions were:

- How is teaching presence evident in self-paced courses on the Landing?
- How does teaching presence promote learning on the Landing (if at all)?

- What learning value does teaching presence on the Landing offer students and staff at the university?

The following sub-questions augmented the primary questions.

- How is teaching presence evident in groups, nets, and sets on the Landing, if at all?
- What indications are there, if any, that the affordances of the Landing prompt learning using the lens Booth and Hultén's (2003) taxonomy of discussion indicators?
- How does participation on the Landing help create a resource or resources that affect individual success and/or success for the organization?

The answer to these questions established the extent of teaching presence on the Landing and showed how this presence manifests itself. Transcript analysis, using codes established by Anderson et al. (2001) and Booth and Hultén (2003) as well as the identification of value creation cycles and value creations stories and interviews described teaching presences and identified the value the Landing provides for the instructors and students. These procedures are described in detail in Chapter 3.

Limitations. The investigation was limited to looking at teaching presence as defined by Anderson, et al. (2001) in two self-paced undergraduate courses partially delivered on the Landing over a three-month period. While the university offers courses supported on other platforms, this study focused on the Landing and its affordances. As an investigation, it was limited to providing a description of activities. Teaching presence was described from an observer's point of view.

Students', teachers' and instructors' perspectives of value were investigated by value creation stories.

The study used the original Anderson et al. (2001) framework to measure teaching presence and situate teaching presence within group, net and set environments. Several factors influenced the decision to use Anderson et al.'s (2001) teaching presence assessment tool for examining teaching presence on the Landing despite more recent suggestions of changes to the original model. First, this study investigated the composition of teaching presence on the Landing in a previously unstudied medium and so it was beyond the scope of this investigation

to consider the nature of teaching presence. The use of the original framework contributed to the establishment a baseline for the study of teaching presence on an e-learning commons and permitted limited comparison with reports of teaching presence in other media. To facilitate this comparison, the original three-factor model with the original arrangement of teaching behaviors was used.

Since the original model was developed, various modifications and additions have been suggested. Shea, Frederickson, Pickett and Pelz (2003) questioned the need for a three factor model and proposed combining direct instruction and facilitation of discourse into directed facilitation. Shea, Li, Swan, and Pickett (2005) and Shea, Hayes, and Vickers (2010) proposed first, the reduction of the assessment tool to two indicators of teacher presence and then, a rearrangement of the indicators into four categories. Miller, Hahs-Vaughn, and Zygouris (2014) in a confirmatory study of Shea et al.'s (2010) work, found strong support for the three factor teaching presence model when they used 17 of the original 28 items in the teaching presence survey. In contrast, Miller et al. (2014) found weak support for teaching presence when they used all 28 items. Miller et al. (2014) surmised that the behaviors measured by the 11 items they found weakened support for the three-factor model involving student to student interactions and concluded that these were not a necessary aspect of teaching presence. Garrison and Arbaugh (2007) pointed out that Shea, et al. (2006) and Arbaugh and Hwang (2006) used students' perceptions of teaching presence and raised the possibility of demographic differences amongst participants accounting for differences in the results of their work.

Caskurlu, (2018) in a confirmatory study of the subdimensions of the three factor model using construct validity reviewed the original three factor model as well as the original model with the addition of each of: learning presence, emotional presence, autonomy presence and agency presence. His results confirmed the three factor model when allowance was made for two error covariances involving the facilitation indicators: "The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn," and "The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking." and the direct instruction indicators: "The instructor provided feedback that helped my understand my strengths and weaknesses relative to the course's goals." and "The instructor provided feedback in a timely fashion." (Caskurlu, p. 11) His study affirms that the original framework is the most widely accepted framework, and that suggestions for

modification, while interesting, need further study in order to be confirmed.

The indicators for teaching presence identify teacher and possibly student involvement in discussion, but do not indicate in detail how they prompt learning. Insight into the nature of interactions on the Landing may increase the granularity of the teaching presence indicators. Booth and Hultén's (2003) taxonomy of discussion indicators provided a tool to establish the depth of discussions in the self-paced courses and supported the investigation of how teaching presence helps move students' thinking toward reflections and learning.

Wenger, et al.'s (2011) value creation stories helped establish the value that teaching presence has for learning on the Landing by a single investigation of the experiences students and teachers value in their interactions on the Landing. Narratives were used as a vehicle for examining actions in the self-paced courses and revealed learning value as perceived by teachers and students. Although Wenger et al. (2011) designed their framework to be an iterative process repeated many times, this study only used data from a single use of the framework. A detailed discussion of this conceptual framework follows in literature review below.

This investigation was limited to the posts on each of the course sites. Only one instructor gave access to the course Moodle site. In order to maintain the balance of the investigation, information from the Moodle site was not included. This decision excluded posts that would have been coded as teaching presence indicators made by the formal teacher and so influenced study findings. It would have taken hundreds of indicators of teaching presence, however, to change the results showing that the majority of the posts coded for teaching presence were made by students.

Private e-mails and social media sites other than the Landing were also excluded from the investigation due to restrictions imposed by the Freedom of Privacy and Information legislation in Canada. The study time frame focused on students, many of whom had completed the course, some of whom attended other universities and had taken a single course through Athabasca. It is possible that student used other platforms to support each-others' learning, however, there was no evidence of student exchanging contact information and so it seems that students' primary contact was on the course sites on the Landing. While these factors may exclude information pertinent to the investigation, the data found on the course sites, the rich information available to the researcher provided a detailed picture of how teaching was present in these courses on the Landing.

As the work of a single researcher, the validity of the investigation results will be strengthened by further research to replicate the results. Studies to confirm the reliability of the teaching presence indicators are not prescriptive and so open to the experiences of the survey writer, respondent or the coder. This breadth of interpretation is made greater in the learning environment due to the nature of the students' relationship to learning in this design.

Definition of terms. As the body of literature concerning teaching and learning in computer-mediated settings grows, terminology takes on various shades of meaning. In this section, teaching presence and its components, groups, nets, and sets, and value creation stories are defined as well as Web 2.0 and discussion as it was used in this study.

Dialogue is form of communication between two or more people. In these courses, it takes the form of brief exchanges.

Direct instruction, the third element of teaching presence, includes presenting content and asking questions for students to consider, monitoring the discussion to keep it on topic, summarizing the discussion points, using assessment and feedback to confirm understanding, diagnosing misconceptions, adding new knowledge and responding to technical questions (Garrison, et al., 1999). These aspects of the act of teaching are the elements that were examined on the Landing.

Discussion is a form of communication, in this study used in its broadest sense to mean examining or considering a matter … in writing (Collins English Dictionary).

Environment is "the aggregate of surrounding things, conditions, or influences" (Dictionary.com) and in this investigation also includes the methods, strategies, and tools used to teach and learn.

Facilitating discourse, a second element of teaching presence includes: creating a climate conducive to learning; encouraging discussion and drawing in participants; identifying areas of agreement and disagreement; seeking consensus or understanding; supporting student contributions through encouragement; acknowledgement or reinforcement; and evaluating learning (Garrison et al., 1999). Supporting student contributions and creating a climate conducive to learning are both actions that are closely related to netiquette.

Groups, a social form, are the most traditional of the three categories with the students

benefitting from the leadership, wisdom and experience of the teacher but suffering constraint from groups' insular characteristics.

Instructional design and organization is one element of teaching presence and includes the actions of setting curriculum and designing methods; setting timelines; using the medium effectively; and establishing and maintaining netiquette. Traditionally, activities such as setting curriculum, designing methods, and setting timelines have been completed before the beginning of a formal course. The effective use of the medium for the purpose of this evaluation refers to the Landing as the medium. Netiquette refers to the maintenance of a productive, respectful environment rather than a specific set of rules. This definition of netiquette is closely related to several aspects of facilitating discourse.

Mashup is a term derived from the music industry, used by Dron (2007) to describe intentional combinations of two or more Internet-based systems using technologies such as Web services and RSS. It is a common feature of Web 2.0 application. Here it is used with its original meaning: "a creative combination or mixing of content from different sources. (dictionary.com)

Nets or networks are a social form made up of connected nodes - often individuals - and develop through interaction. They are fluid and have none of the membership rituals that groups have. Networks derive their value from the number of participants interested in connecting. One measure of the value of a network is Metcalfe's Law: the value of a network is equal to the square of the number of users (Wikipedia, n.d.). Networks' worth rests in the information potential that can be realized from them.

Posts are units of communication and refer to communication by an instructor or student in which objects or information is shared (Jon Dron, personal communication, April 2013).

Sets (Dron and Anderson, 2014) are another social form and share one or more common characteristic and provide potential value in connecting people with similar interests. Sets' strength lies in their independence of member size, their fluidity and the anonymity they afford. Additionally, algorithmic manipulation of the information in sets, via tags, allows students to access information left by other students, opening a body of possible sources of help that otherwise might have been hidden and thus unavailable. The power of sets lies in their ability to allow interests to be traced and aggregated allowing students on the Landing to find the activity of previous students and use others' learning to scaffold their own.

Teaching is a series of actions rather than qualifications or position and as such underlines

the constructivist approach the community of inquiry framework addresses.

Teaching presence is a category of the community of inquiry framework, defined by Garrison, Anderson and Archer (1999) as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes." Teaching presence can be exhibited by any of the actors on the Landing as long as they are contributing to the realization of meaningful, focused learning outcomes.

Value creation stories are narratives of individual and collective experiences, which allow for the integration of data from five cycles of value creation to be integrated into an account of value for an organization. (Wenger, Trayner, & de Laat, 2011)

Web 2.0 is the second generation in the development of the World Wide Web, conceived as a combination of concepts, trends, and technologies that focus on user-collaboration, sharing of user-generated content and social networking. (Collins English Dictionary).

Summary

The allocation of resources in universities is driven by the value return shown by the resource. Traditional methods such as lectures and correspondence delivery models for courses continue to be used because they are entrenched and well established as successful design models.

Schein (2010, p. 219) points out the forces, which play a role in establishing organizational culture: "the beliefs, values, and assumptions" of the organization's founders, their learning experiences as the organization develops, and new values and assumptions introduced by new members. As an innovative solution to the isolation students in self-paced, undergraduate courses face, the Landing merits investigation to determine its value to the university. Social networking is becoming a recognized method of learning and is very different from the traditional lecture, essay, exam design that most of the university learners, leaders and teachers know well. Teaching and learning in a space like the Landing is also very different from what the university's leaders have learned from their experiences within the organization. As shepherds of the university resources, answerable to government ministries, the organizational leaders need to be sure of the value of new tools before they allocate scarce resources.

Just as for organizational leaders, the Landing and its affordances are new to professors and teachers as well as students. Teaching on the Landing may benefit from different

techniques, strategies and emphases. Similarly, learning on the Landing may benefit from teaching that is informed and deliberate (Garrison & Arbaugh, 2007). This study investigated teaching presence on the Landing and shows how the Landing adds value for students and teachers.

Chapter 2. Literature Review

A large and growing body of work focuses on improving teaching ability and making use of technological developments to allow a greater amount of interactivity in online learning. Emphasis is moving from the transmission of knowledge to negotiating meaning for the construction of knowledge (Garrison, et al., 1999) to the use of connections to allow for the management of learning (actionable knowledge) available in specialized information sets (Siemens, 2005). Where previously, distance education had been a one-way street with only one access point, it now has the potential to be a hub with access from many directions.

This chapter reviews the literature from a factory, transmission model to a social networking model. The frameworks, which provide the lens through which teaching presence will be investigated, are discussed next, specifically: teaching presence indicators (Anderson, et al. 2001), the taxonomy of discussion indicators (Booth & Hultén, 2003) and value creation stories (Wenger, et al. 2011).

Overview of Theory and Research Literature

The Landing is a pragmatic response to "the separation of teacher and learner and of the learner from the learning group" described by Desmond Keegan (1996, p. 10). Keegan posited that technology would mediate communication in ways apart from the interpersonal forms students and teachers use in face-to-face education. The advent of computer technology, and Web 2.0 in particular, has allowed the field of distance education to move from a Fordist, industrial model as described by Otto Peters (1993, p. 40) to an interactive model that may alleviate the isolation felt by students and teachers, and a variety of tools and techniques to overcome the transactional distance described by Moore (2007). Thus, it becomes a more viable and current model for relevant learning.

Ally (2008, p. 17) defines online learning as:

> the use of the Internet to access learning materials to interact with the content, instructor, and other learners; and to obtain support during the learning process, in order to acquire knowledge to construct personal meaning, and to grow from the learning experience.

The quest for greater socialization in online learning has roots in the work of John Dewey whose emphasis on the integration of the individual and social aspects of education marked a

paradigm shift in teaching.

Dewey's observations about the nature of learning and the necessity of social interaction to produce effective learning led to merging C.S. Peirce's concept of inquiry with the concept of community. Focusing on face-to-face education, Dewey, provided a shift in emphasis wherein education was viewed less as a commodity to be transmitted and more a series of transactions where understanding was negotiated and constructed.

In the decades after the Second World War, Charles Wedemeyer's experience with the Articulated Instructional Media Project influenced the development of the United Kingdom Open University as the first university dedicated exclusively to distance education. It continued the emphasis on program delivery but included ideas like student support services and periodic face-to-face interactions (Moore & Kearsley, 2012). While the emphasis in Wedemeyer's project was on delivery, student needs, including the need for social interactions, were beginning to be addressed.

Holmberg introduced an emphasis on conversation and empathy as the crucial transactional factors in distance education. He categorized his theory as a "methodological approach" (Bernath & Vidal, 2007, p. 430) with predictive capacity. Holmberg's insistence on an empathetic, conversational style of pedagogy continued the shift from an emphasis on transmission to an emphasis on transaction during the learning process.

Moore's study of transactional distance continued to focus on the student and on the roles and function of dialogue in distance learning. Moore defined transactional distance as "a psychological and communication space to be crossed, a space of potential misunderstanding between the inputs of instructor and those of the learner" (Moore, 1993, p. 22). Subsequent theorists (Dron, 2007a; Saba & Shearer, 1994) have noted the inverse relationship between dialogue and structure. Activity with greater structure had less dialogue and potential for high transactional distance. Activity with less structure had greater dialogue and equal potential for lowering transactional distance, but often at the cost of reducing scalability. He concluded that the least degree of transactional distance occurred in programs with the least structure and the greatest dialogue leading to the greatest degree of constructive interaction. Lower transactional distance allows the student more autonomy in deciding learning topics, learning methodology and the quantity of material to study because the student is able to negotiate this through dialogue with the teacher. This flexibility comes with higher costs for delivery and often a

greater investment of time for both learners and teachers.

Moore's theory allows course designers to support differing degrees of autonomy by controlling the amount of structure and dialogue within a course. Using the theory of transactional distance, programs can be designed to match the perceived level of learner autonomy to optimize learner opportunity (Bernath & Vidal, 2007). This finding has implications for the Landing. Moore's theory was based on media that allowed limited and slow student-teacher and teacher-student communication and was not able to address the current possibility of rich, dynamic student-student and student-teacher interaction which Web 2.0 and sites such as the Landing now afford. As Garrison and Shale (1987) argued, the field has moved from distance education to education at a distance.

Web 2.0 has allowed distance education to take advantage of the interactive, collaborative, and cooperative affordances of social software. Users generate content and are able to work in virtual communities. Its flexible structure offers cost effective opportunities for both synchronous and asynchronous interaction that had not existed previously. As a 2005 study by Stein, Wanstreet, Clavin, Overtoom and Wheaton suggests, transactional distance with teachers can be reduced. Web 2.0 opened possibilities for cooperative, dialogue-based learning.

Cooperative dialogue-based learning shares characteristics with heutagogy, described by Hase and Kenyon (2000) as "the study of self-determined learning" (para. 6) that is influenced by previous learning approaches from andragogy, systems thinking, double loop learning, action learning, and work-based learning. Andragogy is oriented toward the future where knowing how to learn is a basic skill. Heutagogy's learning focus is on sharing rather than using knowledge as a gatekeeping tool. Hase and Kenyon's 2007 article proposed ways in which heutagogical thinking could be used in learning design. They suggested that the curriculum be flexible and open to change to accommodate evolving learner needs; that the learner is the key driver and as such needs to be involved in developing the curriculum. They believe that knowledge and acquiring skill is fundamentally different from learning and that each needs to be addressed appropriately. They propose that the learner should partner with the teacher in identifying learning processes, and the learner should be involved in assessment, self-diagnosis, and the application of knowledge in real life contexts and that learning should be collaborative. They propose coaching for individuals when needed and identify action research and action learning as meta-methodologies in learning.

The concept of networked learning builds on the idea of self-determined learning by putting the learner at the center of the network. Goodyear defines networked learning as: "learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources" (2004, p. 9). The social affordances of Web 2.0 facilitate the connections which allow networks to grow and support learning.

Further narrowing the focus on the learner, Paulsen's (2003) definition of cooperative learning as seeking "to develop virtual learning environments that allow students to have optimal individual freedom within online learning communities" results in the isolation of six dimensions of freedom which define the tensions faced by student in online learning. The freedoms are: time, space, pace, medium, access, and content. Paulsen added transparency to these dimensions. Transparency, the alternative to privacy, promotes cooperation and improves quality.

Extending the concept of learner agency, Dron and Anderson (2014) have proposed a decagon of cooperative freedoms based on Paulsen's work. They retained place (Paulsen's space), time, pace, medium and content and added technology, method, relationship, delegation, and disclosure.

Dron (2007) proposed eight principles for using social software in e-learning design. The principles:

1. Design for change
2. Use stigmergy
3. Survival of the fittest
4. Parcellate
5. Consider the entire system
6. Build from the bottom up: Design from the Top Down
7. Build Trust
8. Design for sociability

are examined in detail in the discussion section of Chapter 7. These principles make use of elements of systems science and complexity theory to allow for the creation of a system that is flexible and learner-centered so that the learning occurs in an environment where the student has maximum control over her experience. The principles use social systems to create an environment where structure is low, dialogue is high, and the learner has transactional control.

Anderson examined the interactions afforded in Web 2.0 in The Theory and Practice of Online Learning (2008) and concluded that the Web's ubiquity makes a general discussion of affordances too broad to be meaningful. He suggested that the specifics of a particular modality are the subject of meaningful discussion. Rather than addressing interaction in terms of the Web modalities they use, he discussed interaction in terms of the actors who use the modalities. He traced the study of interactions from Moore's description of "student-student; student-teacher and student- content" through Anderson and Garrison's (1988) addition of teacher-teacher, teacher-content and content-content interaction to create Anderson's (2003) equivalency theorem which describes the possibility of substituting one form of interaction for another.

Anderson (2008, p. 57) reviewed the social constructivist affordances of student-student interaction discussing the advantages of peer tutoring, reciprocal teaching, student-led teams, and peer interaction as "critical" factors in the development of communities of learning. Student-content interaction was the more commonly recognized face of distance education with first a focus on textbooks and study guides and then a focus on video. Web 2.0 has allowed for content that adapts to the needs of the learner, making feedback more immediate and individualized learning more accessible thereby expanding possibilities for student-teacher interaction. It has also revealed challenges as both teachers and students transition to new models of teaching and learning (Annand, 2008). The speed of synchronous and asynchronous communication on the Web have increased student expectations regarding teacher response times while constructivist learning theory and connectivism move the teacher away from the center of learning activity and place the student at the forefront allowing for and demanding greater learner engagement.

Anderson's (2003) discussion of his equivalency theorem states that as long as one of three forms of interaction: student-teacher, student-student or student-content is high, the other two forms can be low and effective learning can still take place. His e-learning model focuses on learners and teachers and content as the actors in the learning process. His model (Figure 1) accounts for both community of inquiry learning groups and community of learning models. The community of learning model is a structure that uses both synchronous and asynchronous technologies for virtual classrooms often patterned after face-to-face campus classrooms in terms of class structure and teaching methodology. This investigation of teaching presence will shed light on how teaching presence on the Landing relates to the elements of Anderson's model.

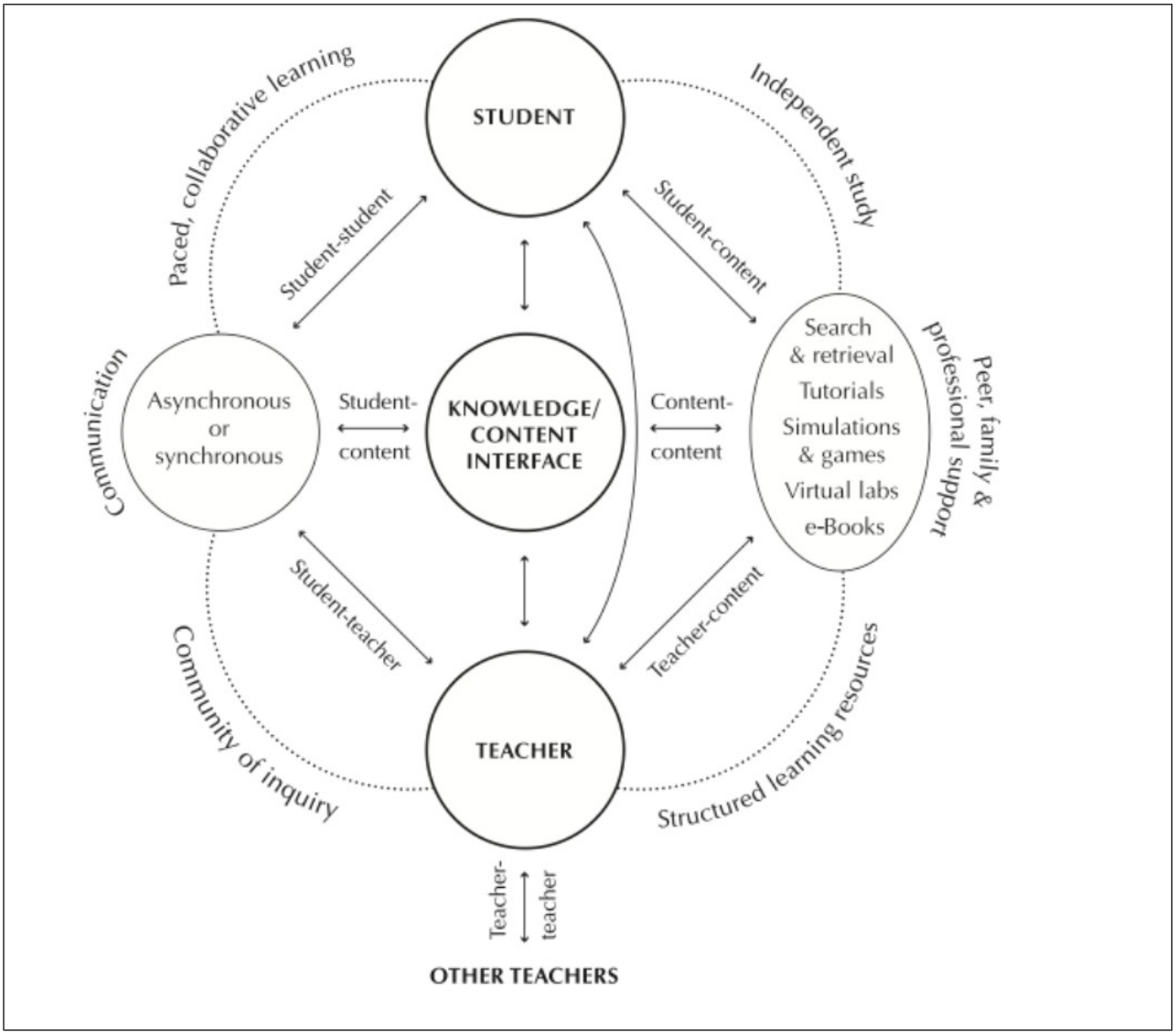


Figure 1. A model of online learning. Adapted from "Getting the Mix Right Again: An Updated and Theoretical Rationale for Interaction" by T. Anderson, 2003, The International Review of Research in Open and Distance Learning, 4(2), p. 9.

Related to the model for online learning, Anderson et al.'s (2001) teaching presence transcript assessment tool will provide a structure for evaluating the extent to which the Landing hosts teaching presence in two self-paced, undergraduate university courses. While the tool was developed to describe time-bound, group-paced, credentialed learning, the university's expansion to the use of the Landing for self-paced courses prompts an investigation of teaching presence in that medium. Evidence of teaching presence (or its absence) in self-paced courses

will increase the robustness of the assessment tool by extending its validity to courses using another delivery model.

Theory and Research Literature Pertaining to the Landing

The affordances of Web 2.0 technology have both solved problems and raised new questions about the nature, scalability and costs of online learning and the interactional demands that characterize both learning and teaching. The following section discusses how the Landing has been designed to take advantage of Web 2.0 affordances to help address these issues.

Community of inquiry. Extending Peirce and Dewey's concepts of inquiry and community, Lipman (1991) coined the term community of inquiry. He conceived communities of inquiry as places where students in physical communities practice respectful learning by using others' ideas as building blocks. They challenge unsupported opinions with requests to substantiate opinions, help each other to extend their thinking and identify assumptions.

Garrison, Anderson, and Archer (1999) developed the community of inquiry model to describe what they observed in computer-mediated conferencing. Social presence which reflects the participant community, cognitive presence reflecting the "struggle to attain belief" (Peirce, 1877, para. 17), and teaching presence reflecting the actions of designing and facilitating activities that allow learners to pursue and achieve their goals are the elements of the community of inquiry framework. Teaching presence from the Community of Inquiry lens will be used to evaluate the teaching affordances of the Landing.

Teaching presence. Teaching presence, a necessary component of a community of inquiry, consists arguably of three components: instructional design and organization, facilitating discussion, and direct instruction. Despite two studies (Shea, et al., 2005, & Shea, Pickett & Pelz, 2003) that questioned the three-component model, this investigation will use the original three-component model for two reasons. First, this investigation is situated in a learning environment where students study in self-paced courses as individuals rather than as a part of the group. Shea et al. (2003) studied undergraduate students in groups communicating in asynchronous threaded discussions. Factors beyond the presence or absence of teaching presence may have played a role in their findings. Shea et al. (2010) advocated a realignment of teaching presence indicators with the addition of a fourth category – assessment – adding to questions of the model's stability. Arbaugh and Hwang (2006) and Arbaugh (2007) confirmed the three-

construct model. It is beyond the scope of this study to enter into an investigation of the composition of teaching presence. Its existence in self-paced courses is the subject of this investigation. In addition, in order to maintain a field of study in which the factors being studied can be compared, the original three teaching components will be used in the analysis.

Secondly, as Garrison and Arbaugh (2007) point out, "From an educational perspective, the distinction between facilitation and direct instruction is an important distinction." (p. 162) While the distinction may not be evident to undergraduate students, Arbaugh & Hwang (2006) found evidence of all three components of teaching presence in graduate level courses, prompting Garrison & Arbaugh (2007) to observe that undergraduate students may not have sufficiently sophisticated thought processes to distinguish between the two components. The importance of facilitation and direct instruction from a teaching perspective will be discussed after the discussion of the single component that has been confirmed in all studies.

Instructional design and organization. The choice of the Landing as a teaching environment offers both opportunities and challenges from an instructional design perspective. The design aspect of the teaching presence framework: utilizing the medium effectively, applies directly to the Landing due to its relatively recent conception and unique nature. Its affordances impact the organization of the courses. Students in these self-paced, undergraduate courses are offered the most independence and student control but potentially experience the most isolation of the learners at the university. Students are not only isolated from other students currently working through the course, but also from contributions created by their predecessors in the course and from students taking other courses in their faculty and in other faculties in the university.

Continuous enrollment, while efficient and workable, does not enhance the students' educational experience. As Dron proposes in his transactional control model (Dron, 2007a), student control and choice are related. The more closed the environment, the more limited the individuals' choices. As an environment opens, the range of choices increases although control may decrease. Opportunity for the exchange of big ideas, the essence of a university, is only available when students can choose to interact with a wide variety of ideas and concepts. The Landing is designed to address this shortcoming, which has plagued distance education since its inception.

Dron and Anderson (2014) describe The Landing "as a place to gather and as a space between other spaces . . . to fill the gaps, both socially and from a systems perspective." (p. 206) The Landing design offers ownership and control to its users, both students and staff, unlike formal course delivery areas of Athabasca University in which control of courses is handed to administrators, subject experts and professional designers, but never to students. It is purposefully diverse, designed to meet a variety of needs, and deliberately downplays an emphasis on teaching activities while offering an increase in informal learning opportunities, so that it would be perceived to be free from hidden motives. It is also very adaptable and configurable at individual and group levels creating an approach that Dron (2012, p. 26) terms as "soft". The Landing is a space where students can control their connections, create or become members of groups, develop and nourish networks and discover sets of others with related interests. These actions promote social interaction in spaces beyond formal classroom spaces to use and increase the affordances of social constructivism and connectivism.

Dron and Anderson (2014) considered several principles in the design of The Landing, including those outlined in Dron's (2007b) discussion of the potential social software offers e-learners. Adaptability, both to the changing needs of individual learners and to the need for the Landing to evolve into different forms, is crucial to the site's survival. Both the principles of adaptability and evolvability have implications for how teaching presence could be exhibited on the Landing.

Another design feature is parcellation. Parcellation, the ability to build, or allow the development of niche spaces, weakly connected to other similar spaces, allows for the incubation and evolution of ideas in an organic manner. Dron (2007a) cites a double advantage in parcellation for pedagogy, using social networking sites. Teachers can re-establish control relinquished during constructivist learning and students can increase control by using the affordances of bottom-up organic design.

Students' ability to control their experience has the potential to increase trust both in the site and the individuals with whom the students interact. In his discussion of the principle of trust, Dron (2007b) refers to the various aspects of trust as it pertains to e-learning systems. Users need to know the site is working and secure. Trust in the reliability of posted information and confidence that one's presence on the site will be respected are crucial.

The latter aspect dovetails with control issues and prompts discussion about the need for

negotiation when site behavior is not prescribed and controlled from above. The Elgg platform allows for individual control over who has access to their site, which in turn allows the individual to make decisions regarding the level of trust they have in the site. In addition, every page on the Landing has a support link, which users can use to report perceived threats to privacy, or any other type of inappropriate behaviors.

The openness of the site allows participants (teachers or students) to set curriculum, in so far as curriculum describes what they want to study and how they will approach it. The participants, who can also establish time parameters, can design methodological approaches. It is up to the participants to see that they use the medium effectively and that the conventions of netiquette are observed. These are aspects of the design function of teacher presence that students may take responsibility for.

The site also allows participants to choose the environment that best suits their teaching/learning needs. Participation within a combination of groups - tribal groups in the case of this study, nets or sets - is chosen by the actor and represents different and possibly new teaching opportunities. Users benefit from stigmergic affordances which may have been present in other forms of teaching online but were not recognized as influential.

Many subtle signs provide users with information such as the level of trustworthiness of the site. Dron's (2007b) principle of stigmergy speaks to the use of signs as guideposts. Site users can benefit from obvious signs such as posts, recommendations and comments signifying the presence of others or less obvious signs such as a counter indicating the number of times a page has been viewed by others - a sign left by the software. While stigmergy can be helpful in guiding users through the site, Dron warns of the danger of imbalance leading to some users getting more and more from the site and others getting proportionally less – an effect known as the Matthew Principle. Early users, or nodes in network terms, develop more connections than later users, so their connectivity develops more rapidly resulting in the rich, or early users, getting richer – greater connectivity - and the poor, later users, getting poorer or having fewer connections. Design features, particularly parcellation can limit the negative effects of stigmergy.

Connectivity is a foundational principle in social networking. However, connectivity constantly changes in response to new opportunities, new information, new interests and motivations. Effective design needs to account for the ubiquity of change within the system. The

ability to change in response to new conditions affords the users opportunities for connections that meet their most current needs and allows for an immediacy that was not present in earlier forms of computer-mediated learning.

The principle of context also suggests that designers and users be aware that the site is only part of a larger system. Dron states that if the "system is not used with the intent to learn or assist learning" (2007b, p. 67) it will probably become something else. Fitness for purpose is essential to keep people using the site.

Scale is related to the principle of context. Scale, in all areas of design, affects the speed with which the system reacts to input. The larger the scale, the slower the response and while small-scale elements change quickly, they often exist because of the existence of the larger system. For example, in order for a course within a degree program to be changed, - a large-scale change – the need for change has to be recognized. Then a course needs to be proposed and presented for approval; the course needs to be designed, tested and then introduced. This process uses many resources in terms of time, personnel, and physical resources. A student or teacher can develop and add a Wiki or a blog – a small-scale change - and have it appear - and be ready for use within a matter of hours or days. Small-scale actions drive the vibrancy of the system by fueling constant iteration and reiteration.

The small-scale action of individual users can affect the system through designs built into the system. Dron (2007b) cites constraints such as Elgg's user control of privacy settings as examples of a constraint supporting learning. At the level of small-scale actions, Dron's principle of sociability states that direct interaction between people needs to have support from the system for learning to occur. This principle has implications for teaching presence. Designing and organization, a teaching presence indicator, includes the act of ensuring that the course is organized in such a way that students feel confident risking the mistakes that are necessary for deep learning. Fine-grained communication supported by Elgg software allows teaching actions such as enabling discussion prompted by what students see in the various resources supported by the software without the fear of being open to an unsympathetic audience.

It is crucial that its users own the Landing so that the users themselves control the content and its audience. The site is designed to address the need for socialization and to avoid an emphasis on explicit teaching. The Landing was conceived as a place where social engagement

and connection would counteract the isolation felt by many students who study at a distance (Garrison, 1997; Rovai, 2002).

Ownership. In order to ensure that ownership was distributed among the Landing users, Dron and Anderson invited staff and students to participate in choosing the tools, technologies and purpose of the Landing. The initial group has evolved into a group called Friends of the Landing, has doubled in size and continues to support the site. This group is not an ownership or oversight group but meets to share their use of the Landing and what they see occurring on it. Information, provided by the group, is one way of informing design. In addition to the group input into the Landing, users can comment on content to the content author and/or to the Friends of the Landing group to record affective reactions to the site. The ability to comment on the content and affective aspects of the site contributes to the users' sense of ownership.

Diversity. Dron and Anderson designed the Landing to be purposefully diverse to avoid what was seen as a drawback on Me2U and community@brighton, previous iterations of social networks at Athabasca University and the University of Brighton. Both sites evolved into areas of focused activity that tended to discourage diversity. The Athabasca site, Me2U, was used for direct teaching by the Center for Distance Education and so was perceived as an extension of course activities. Community@brighton also had a strong teaching presence as well as serving as an announcement board and a rental information exchange. Neither of the sites developed the diversity that prompts curiosity and engagement fueling the spontaneous insights key to promoting constructivist learning.

Designing methods and using the medium effectively are areas of possible challenge for formal teachers. Theoretically, the design of the Landing will allow teaching methods to emerge from niche areas in the Landing. These strategies could arise from informal teaching occurring within the organic activity on the Landing. Maintaining netiquette, the last aspect of the instructional design and organization element of teaching presence may arise as an activity of those taking on a teaching role on the Landing. With the design and organizational tasks complete, the teacher focuses on facilitating discourse, learning activities and supporting and learning for the students in the course.

Facilitating discourse. Anderson et al. (2001) list the following indicators or actions which constitute facilitation of discourse in communities of inquiry: identifying areas of

agreement or disagreement; seeking consensus or understanding; supporting student contributions through encouragement, acknowledgement or reinforcement; creating a climate conducive to learning; encouraging discussion and drawing in participants; and evaluating learning.

Facilitating discourse is "the critical task" of teaching presence and can be the most time-consuming role for teachers in communities of inquiry since it begins with developing a sense of trust as the course begins and can continue until the last comments are posted (Anderson, 2008). The Landing's design encourages dialogue and interaction. The lack of teacher led, computer-mediated threaded discussions on the Landing could result in student discussion being less discrete and concentrated than discussions in formal courses. The view into student thinking and learning that the Landing affords could allow teacher support of students' social presence, which generally takes the form of discourse. The teacher, traditionally, models appropriate behavior (the apprenticeship model) and works to create a balance between reticent and outgoing students in order to support the students' efforts to learn. Anderson et al. (2001) suggest that the areas of resolution of agreement or disagreement indicate learning, a finding echoed by Booth and Hultén (2003). By helping students integrate seeming conflicts into their understanding, the teacher is supporting student learning. Identifying consensus and areas of shared understanding also support student learning by helping students be aware of the larger picture composed of the details of their discussion points. Finally, the teacher is responsible for keeping the learning process moving in a timely fashion – although this responsibility is far different in self-paced than in paced courses.

Direct instruction. Anderson, et al. (2001) provide the following indicators of direct instruction: presenting content including questions for consideration; keeping the discussion on topic; summarizing discussion; confirming understanding through assessment and feedback; diagnosing misconceptions; adding pertinent knowledge, responding to technical questions. On the Landing, direct instruction, which traditionally has been the concern of credentialed teachers, can be practiced by all participants whether they are formally teachers, students or alumni.

Direct instruction takes the form of intellectual and scholarly leadership in sharing subject matter expertise as well as the teacher's enthusiasm for and understanding of the material. The cognitive apprenticeship model (Brown, Collins, & Duguid, 1989), and the apprenticeship in thinking described by Rogoff (1995) as well as Vygotsky's (1978) description of scaffolding all refer to the teacher's role in assisting the student's mastery of the subject matter.

Booth & Hultén (2003) have shown that weak teacher presence often results in discussions that remain at the information sharing stage without moving on to knowledge construction. The teacher can use her broader view of the subject area to summarize knowledge and to demonstrate and make explicit students' construction of knowledge. Formative assessment allows the teacher the opportunity to both confirm understanding and correct misunderstanding as well as suggesting additional resources to support student learning.

Direct instruction also refers to the provision of expertise by participants other than those with the official designation of teacher. The value of this expertise, along with the value created by the other two elements of teaching presence: facilitating discourse, and design and organization will be investigated in this study. Literature pertaining to establishing learning value of teaching presence in the Landing is the focus of the following sections.

Value creation. While there is value from an academic point of view in identifying teaching presence on the Landing, presence itself is not an indication of value for the university as an organization. Wenger, Trayner and de Laat (2011) provide tools to identify value in communities and networks, which they see, as interconnected parts of learning rather than non-related entities. The following presents a discussion of significant differences and the common elements in communities of practice and communities of inquiry. An in-depth discussion of value creation cycles follows, and the chapter ends with a discussion of the possible contributions the investigation could make to the literature.

Communities of inquiry are groups with a focus on the resolution of a theoretical or academic problem – knowledge based on second order experience – learning about how things are known (Laurillard, 2002, pp. 19-23). Communities of practice resemble communities of inquiry in their focus on learning together and leveraging knowledge within the group to solve a knowledge problem. Communities of practice include groups often defined by a common workplace or a common job description. Communities of inquiry are normally time bound but ideally continue after the immediate question has been addressed.

Networks in both communities are connections and relationships which enable information flow and exchange, linking, and knowledge creation. Both communities can include networks and may begin as sets - those interested in a particular topic. In some instances, these sets evolve and develop into networks and even groups. The community of inquiry framework focuses on three presences, one being teaching presence. The community of practice value

creation framework focuses on learning and participation in the community. The feedback loop in which knowledge is expressed, passed on and refined echoes certain teaching presence actions in the community of inquiry. Although the community of practice literature does not mention teaching at great length, its applicability to assessing teaching value will be discussed below.

Garrison, et al. (1999) describe seeking learning with the hope of finding answers. The goal of communities of inquiry is the attainment of second order knowledge: knowing about knowledge. Communities of practice, by contrast, focus on first order knowledge: (Laurillard, 2002) knowing the actual object, often the practices that form the basis of an organization's operation or finding concrete solutions to common problems.

Annand (2008) discusses similarities between idealized communities of inquiry and communities of practice, which he characterizes as learning within organizations. Both frameworks rely on sustained communication supported by stable groups seeking to know realities that are subjective, with the goal of co-constructing knowledge. He cites the relative lack of shared competence in most online undergraduate courses (and especially in self-paced courses) as a hindrance to the formation of true communities of inquiry and minimizes the benefits of collaboration and co-construction of knowledge.

Stephen Powell (2007) in a blog, suggests that the integration of the community of practice evaluation and the community of inquiry evaluation frameworks would allow for the investigation of the acquisition of desired behaviors rather than exclusively investigating the elements of teaching and learning. Powell believes that by combining the two frameworks, success would be measured in terms of new behaviors – transformative indicators – rather than what was learned about a given topic, creating a new measure of value and a new definition of success as discussed by Wenger et al. (2011) as a metric indicating value at a cycle five level.

Wenger, McDermott, and Snyder (2002) discuss value to the organization in terms of short and long-term value and tangible and intangible value. Communities of practice in the short term, help with the solution of short-term, practical problems. Wenger, et al. (2002) state that this allows for more risk taking and supports synergy across the organization. Long-term value grows from short-term values and is indicated by increased professional development allowing for the establishment of promising practices, which in turn, increase professional knowledge.

For Wenger et al. (2011), the key characteristic of a community is the action of individual and collective learning to develop common actions. Learning value comes from the community's

shared intention to advance learning in given areas. As social space, communities share some of the characteristics of groups. The learning partnerships that develop can have various levels of formality, but unlike a group in which there is a stated purpose, in communities, the intention of partnerships can be either explicit or tacit. Within the community, a shared practice develops as a result of the learning that has been advanced by the community's intention. Like groups, communities, according to Wenger, can be entrapped by their culture and become closed and inflexible. Through commitment to the success of the community, members can use tools such as negotiation to give the community new life, provided there is a sufficient level of commitment for the community to stay vibrant.

Networks' value lies in the opportunity to access numerous and varied sources for learning. However, networks can be busy places where information sharing is spontaneous and unpredictable. It is the spontaneity and unpredictability of the information that gives learning value to networks. The business of a network for educational purposes requires a strong focus on the part of the learners. The spontaneity and unpredictability that give networks their power can also diffuse focus and commitment on the part of the learners, leaving networks without the power groups can have to move learning forward. Wenger et al. (2011) identify individuals as being responsible for evaluating information and deciding its relevance both for the individual and the group. Individuals acting as nodes then can leverage network affordances to pass the information on or to refute it. This action, performed in a timely manner, strengthens the network by reinforcing existing nodes and by creating the opportunity to form new connections. The opportunity for learning increases with the network's increased potential for new connections, which can provide the opportunity for random serendipitous links.

Wenger et al. (2011) state that communities and network structures interact dynamically to use the focus of a community with the fluidity of a network to combine individual and collective learning. To measure the learning value in communities and networks, Wenger et al. (2011) propose examining narratives from different points of view. Community and network survival depends on the value individuals and collectives derive from participation. If participants do not find value in the community or network, they will not participate, and the community or network will fall apart. Other stakeholders who derive value from the community include the organizations to which participants belong, sponsors, and the recipients of services provided by the community or network.

A second aspect of determining value for communities and networks is examining learning over both the short-term and the long-term. Over the life of a community or network, learning evolves from short-term learning, applied to solve a particular problem to long-term learning, which comes from an accumulation of practices that are regarded as a body of solutions applied beyond their original communities and networks. The long-term learning becomes part of the organization's culture.

Wenger et al. (2011) use narratives to capture the complexity of communities and networks at a personal level encompassing the experiences of individuals and at a collective level, encompassing the experiences of social networks and communities. They describe how personal networks are the building material of social networks. They also point out that participation in broader networks is generally through participation in personal networks so that the collective identity of a community is made up of the individual stories of each member and the members of a community take on aspects of the community identity as part of their own in an iterative process. In this way, individuals experience learning that is unique for them because of their participation in one or many communities.

In discussing narratives, Wenger et al. (2011) describe the complex relationship between personal and collective narratives. While awareness of community narrative resides within the community, awareness of a network's collective narrative resides outside the network in external perceptions of what the network is doing. Network visualization techniques show how the network is structured and what the connections do, allowing a collective narrative to be created. The need for an external view to frame the network's collective identity is contrasted with a community's collective identity, which participants know because the creation of a collect narrative describing a practice is one aspect of forming a community. Due to the differences in understanding the collective narrative, discussions to develop consensus as to what the collective narrative is, are useful for communities. The tension resulting from discussions aligns personal understanding with other members' understanding of the collective narrative, aids in assessing and creating the value for the organization.

Wenger et al. (2011) describe two functions of narratives in the process of assessing and promoting value creation. Ground narratives describe the actions that shape and subsequently take place in the community or network. Aspirational narratives tell what people expect from a network, or what a successful community is like. They focus on the value the network or

community is expected to have for its participants. The space between ground narratives and aspirational narratives is described in terms of five cycles of value creation.

While communities of practice are not part of the Landing design, they share characteristics with communities of inquiry. Appendix B details how community of inquiry indicators, and community of practice indicators and measures of value creation in networks and communities dovetail.

Based on Wenger's (1998) previous work with communities of practice, Wenger, Trayner and de Laat (2011) have developed a conceptual framework for assessing value creation in communities and networks. Wenger et al. (2011) define value creation as the "learning enabled by community involvement and networking." (p. 7). The framework uses value creation stories that are bound by personal or ground narratives which describe community and network activities, and aspirational narratives which describe expectations or successes as seen by the community or network.

In an adaptation of Kirkpatrick's Training Evaluation Model, Wenger et al. (2011) have divided the space between personal narratives and aspirational narratives into five cycles, which describe the actions and values produced at various points in time during the life of the community or network.

Value creation cycles. Wenger et al. (2011) described value in communities and networks as being cyclical and identified five cycles of value: Cycle 1 - immediate value: activities and interactions, Cycle 2 - potential value: knowledge capital, Cycle 3 – applied value: changes in practice, Cycle 4 – realized value: performance improvement, Cycle 5 – reframing value: redefining success. They caution that the complex relationship between the cycles does not imply a set sequence or hierarchy. Various cycles describe areas that interest different actors in the organization. The framework also includes value creation stories. In recognition of the complex relationship between cause and effect in improvement, value is drawn from the stories of the actors themselves who describe the results of the activities within the community, what arose from the results, the effect the actions had on performance, and what changes the actions made to the definition of success in the organization.

Cycle 1 is concerned with the immediate value in activities and interactions created by actions such as: helping a member with a difficult case, or providing a tip to a colleague, or passing on information or giving input, all examples equivalent to direct instruction. These

activities are measurable and show immediate value.

Cycle 2 addresses potential value or knowledge capital. This is value that has not yet been realized but has the potential for value at a later date. Wenger et al. (2011) explain that knowledge capital appears in five forms: human capital, social capital, tangible capital, reputational capital and learning capital. Each of these forms includes aspects of teaching presence. Human capital or personal assets are measured in terms of increasing personal skill levels or individual learning. It can appear as an important piece of information, direct instruction or a new perspective resulting from the facilitation of discourse where an actor identifies areas of agreement or disagreement or seeks consensus or understanding within the group. Human capital can also be enhanced when participants increase their sense of status which can result from facilitating discourse i.e. encouraging, acknowledging or reinforcing student contributions, setting a climate for learning and drawing in participants.

Relationships and connections are social capital and are measured in terms of increased collegiality: knowing of whom to ask questions, a common language and understanding, and/or greater social resources. Social capital can be increased when participants are able to give direct instruction by injecting knowledge about other participants who can be helpful because of a particular skill or achievement. Teaching presence in the form of facilitating discourse and direct instruction can enhance an increase in shared understanding and common language, both signs of social capital.

Resources (tangible capital) refer to access to information, documents, tools and procedures as well as information such as tag clouds, links and references, and other structures available to individuals due to their participation. Access to the Landing, afforded to Athabasca University students, staff and alumni, is an example of tangible capital. Recognition of the community's usefulness and its strategic relevance, which for the Landing could include teaching presence that supports student learning, is another example of tangible capital. Direct instruction is the most obvious teaching presence related to tangible capital. The teaching presence concerned with instructional design and organization also contributes to tangible capital in terms of utilizing the medium effectively.

Reputational capital refers to the collective, intangible assets of the community or network. This is measured in terms of external recognition of the significance of the community or network. It does not easily accommodate teaching presence and is beyond the scope of this

investigation. In fact, the reputational capital of the Landing, could form a study in and of itself.

Learning capital, defined by Wenger et al. (2011) as a "transformed ability to learn" ("Cycles of value creation in networks and communities," Cycle 2, paragraph 6), is the traditional concern of the teacher. All three elements of teaching presence play a role in developing learning capital. The instructional design and organization aspect of teaching presence allows teaching activity to expand the ways in which the Landing is an effective teaching medium. It also allows for the establishment of appropriate netiquette. The facilitating discourse aspect of teaching presence gives teachers opportunities to set a climate for learning in which students are all comfortable participating and where dialogue is supported as a vehicle for learning. Teacher guided discussion is where student contributions are encouraged, acknowledged and reinforced, and consensus and understanding are supported. Direct instruction offers several ways in which learning capital can be built. The ability to inject knowledge; focus and summarize discussions and diagnose misunderstandings or misconceptions in discussion is fundamental to transactional instruction and grows learning capital particularly in instances where students begin to take on the leadership role of teaching (Booth, & Haltén, 2003; Pilkington & Walker, 2003). Relinquishing aspects of the traditional position and function of the teacher is characteristic of constructivist and connectivist learning and can be leveraged to support students' journeys toward becoming independent learners.

Cycle 3 value addresses applied value seen as changes in practice. This cycle potentially addresses value for the university. As both an applied and potential value, it focuses on changes in practice, particularly in how material and approaches have been modified for application to new situations. For those outside the community or network, this cycle can be seen as a sign of improvement or deterioration. For members of the community or network, this can be an important outcome of membership. Adapting teaching practices to accommodate the affordances of the Landing offers the potential for developing teaching practice that is particular to the Landing. Teaching practice that changes to align with the medium has the potential for improved performance and thus greater value for the university.

Cycle 4, realized value, addresses the improved performance from Cycle 3. Wenger et al. (2011) caution that new practices do not always translate directly to improved performance, so this cycle does not always follow as a result of cycle 3 values. It relates to improvement in performance and shows the effects that applying knowledge has on organizational values and

what stakeholders view as important. One of the purposes of this study is to determine whether teaching presence on the Landing (if it exists) has had an impact on realized value for instructors, students and the university as an organization.

While Cycle 5 may or may not be achieved, this study will ask participants to describe how their definition of success has been reframed (if at all). By reframing value, the definition of success changes as realized value redefines what the organization perceives as success. Strategies, goals and values can be redefined at three levels: individually, collectively or organizationally. As with all social forms, including social networks, individual changes in the definition of success come about more rapidly than do changes at collective and organizational levels due to the size and inertia that grow in proportion to the hierarchical level in the organization – an example of scalability. When an organization changes what it sees as successful and accepts new ways of recognizing success, it changes its organization direction, its relationship with its stakeholders, and possibly contributes to new frameworks for societal systems. (See Appendix B for detailed comparison of value creation cycles and teaching presence indicators).

Factors other than the realized value come into play in reframing value for an organization and may carry more social weight. Value within the cycles varies according to the particular stakeholder's needs and values. In this study, the focus is the teaching value created and nourished by the Landing. Teaching value varies according to the position of the evaluator. For the teacher, value resides in increased transactional capability and student learning – without major increases in workload. For students, value comes in the form of increased transactional capability including relative ease of learning, the ability to take on the role of the teacher when appropriate and to control interactions and privacy levels. For administrators, value is measured in increased completion rates and customer/student satisfaction. Each actor will see value in different cycles.

The cycles represent an ideal developmental path for communities of practice and networks, but Wenger et al. (2011) do not suggest that communities and networks follow the cycles in sequence or even finish all of the cycles. The process is iterative and is not necessarily completed. Development through cycle five, while desirable, is not necessary for a successful community or network. The purpose of the cycles is to identify actions within the community or network to allow various stakeholders to identify aspects of the community or network they

recognize as being of value to their practice. The cycles build a framework, which supports the process of assessing value. To assist in assessing value, Wenger et al. (2011) propose the use of proxies to indicate valuable actions, which may not be easily identifiable.

Proxies are indicators that in themselves do not indicate value, but, suggest value because of what they represent. In the information revealed in the examination of each cycle, Wenger et al. (2011) state that indicators can lead to reasonable assumptions about other indicators. If an action (cycle one) is repeated by a large number of people because it leads to success then it can be assumed that it improves performance, which is a cycle four indicator. Evidence of learning can be a proxy for teaching in that if learning has occurred, someone, at some point, likely engaged in teaching actions. Wenger et al. (2011) propose the use of value-creation stories as a strategy to trace value creation across the cycles and advise that proxies are often a more practical indicator of value than trying to search for definite, factual evidence.

Wenger et al. (2011) describe success in the organization as the confluence of two metrics: value indicators identified in the answers to key questions and value creation stories. The picture of value in the organization is one that is created over multiple iterations of value creation assessment. The methodology of determining value from the indicator questions and the creation stories involves combining cycle indicators and value stories in a matrix to determine where value lies within the community. Stakeholders are then able to assess where their value lies. Combined with an identification of teaching presence on the Landing, these value indicators will begin to assess the value of teaching presence on the Landing.

Value creation stories. The complex relationship between learning and outcomes make it difficult to trace cause and effect patterns. The complexities of the relationships can make the value of community or networks difficult to ascertain for a given cycle. Rather, value is revealed by tracing actions in the community or network through the various cycles.

Value creation stories are formulaic. Like all formulaic stories, they follow the same pattern describing the creation of value by activities. Cycle 1 describes a series of events or effects. Cycle 2 is represented by a resource, which can be in the form of a response, an idea, advice or the formation of a relationship. The application of the resource and the effect it had on the storyteller's practice is described in Cycle 3. An outcome resulting from applying the resource, a performance measure, for example, indicates Cycle 4 activity. Should the current

performance measures not be adequate to describe what has happened within the community or network and a new measure is considered, Cycle 5 has been reached. Proxies or inferences may be at either end of the process either because the beginning of a community or network has been lost or because the story is not finished.

The choice of story-tellers is driven by activity on the course site on the Landing. A participant who creates posts, who has a particularly intense interaction, challenges assumptions, debates an issue, or gives feedback, or makes new connections are all potential story-tellers. Choosing actors who have participated in this way allows their actions to be followed through the cycles of value creation. Questions framing the value creation cycles help the participant storytellers describe their learning and practice. The questions ask about meaningful activities, insights gained, and information accessed, how practice was influenced, differences in performance and the contribution participation in the community or network made to personal or professional development. They indicate how this contributed to the goals of the organization and finally whether the participant's understanding of what is important for the organization has changed. These stories reinforce the importance of the indicators and help position them in the cycle of value creation. The stories can also be used as proxies when there is not an obvious cause/effect relationship. The learning value created by participation in the Landing can be drawn as a proxy for teaching presence on the Landing. The various values, if any, created by participation can be traced to teaching presence indicators. The values will act as proxy indicators for the various actions that show teaching presence. The degree of teaching presence exhibited on the Landing could reveal how the Landing allows formal teachers and teaching actions for various students in self-paced undergraduate courses to support student learning.

Value in Wenger et al.'s (2011, p. 7) work refers to the "learning enabled by community involvement and networking" actions described by connectivist theory. Value is measured by using a set of indicators to facilitate data collection and a procedure for using the indicators to tell value creation stories to give meaningful accounts of learning value in the actions of communities and networks. The use of this framework to investigate value in second order learning is an extension of its original purpose.

Groups, nets, and sets. Dron and Anderson's (2014) typology of social forms for learning: groups nets, and sets make up the environment in which learning takes place and, in some ways shapes the activity that takes place in it. Dron and Anderson use the image of the set

of people in a given section of the city – the people who just happen to be there because of an interest in the area. These sets are made up of subsets – adults or children. There are also groups in the city who share purpose and belong together. There are also networks consisting of people who are exchanging information and creating knowledge. These social forms are the context in which people interact on the Landing.

Groups have form in terms of behavioral expectations that regulate members, entry and exit rituals, and exist whether or not there are active participants. Groups are often structured as a hierarchy and members have specific roles. They are also the most easily recognizable educational forms.

Nets or networks are made up of nodes – the participants – and edges – the activity that connects the participants. Unlike groups, networks do not have a defined membership and have no hierarchy. Networks exist because of the activity between participants and the learning value participants can offer.

Sets consist of people with a common characteristic or interest. In an educational set, membership is driven by a search for knowledge and participants can be unaware of the identity other participants. Blog posts and tweets are forms of communication that work well in sets because of their emphasis on information as opposed to people.

Activity in these self-paced courses will be categorized as belonging to groups, nets, or sets and observations will be made about the influence these social forms have on learning. These observations are meant to prompt discussion and study of these forms in this setting.

Contributions to the Literature

Teaching presence in self-paced, undergraduate courses delivered on a site such as the Landing has not been investigated. Dron & Anderson (2009), in discussing the use of the Elgg platform at the University of Brighton, caution that learning in institutions is not well suited for learning in nets and sets - elements the Landing was designed to nurture. In a study of a self-paced undergraduate psychology course, Anderson, Upton, Dron, Malone, and Poellhuber (2015) found evidence of set-based activities rather than evidence of group-based activities on the Landing. They posit that network activity may have been inhibited by the fact that students were responding to work left by people who no longer used the Landing. They did identify both instances and potential for interaction in activities that are archived on the Landing.

This evaluation will begin the examination of teaching presence on a social networking

site that was designed to provide increased opportunities for socialization in a distance education university. Booth and Hultén's (2003) taxonomy of discussion indicators will help reveal the nature of discussion in the courses and possibly increase granularity in the teaching presence indicators. The use of Wenger et al.'s (2011) value creation framework will give an indication of the value the Landing creates for the university. As Wenger, et al. (2011) caution, the determination of value is an iterative process, which this investigation will begin. The concept map below (Figure 2) shows the relationship between the teaching presence model, the taxonomy of discussion indicators and value creation stories.

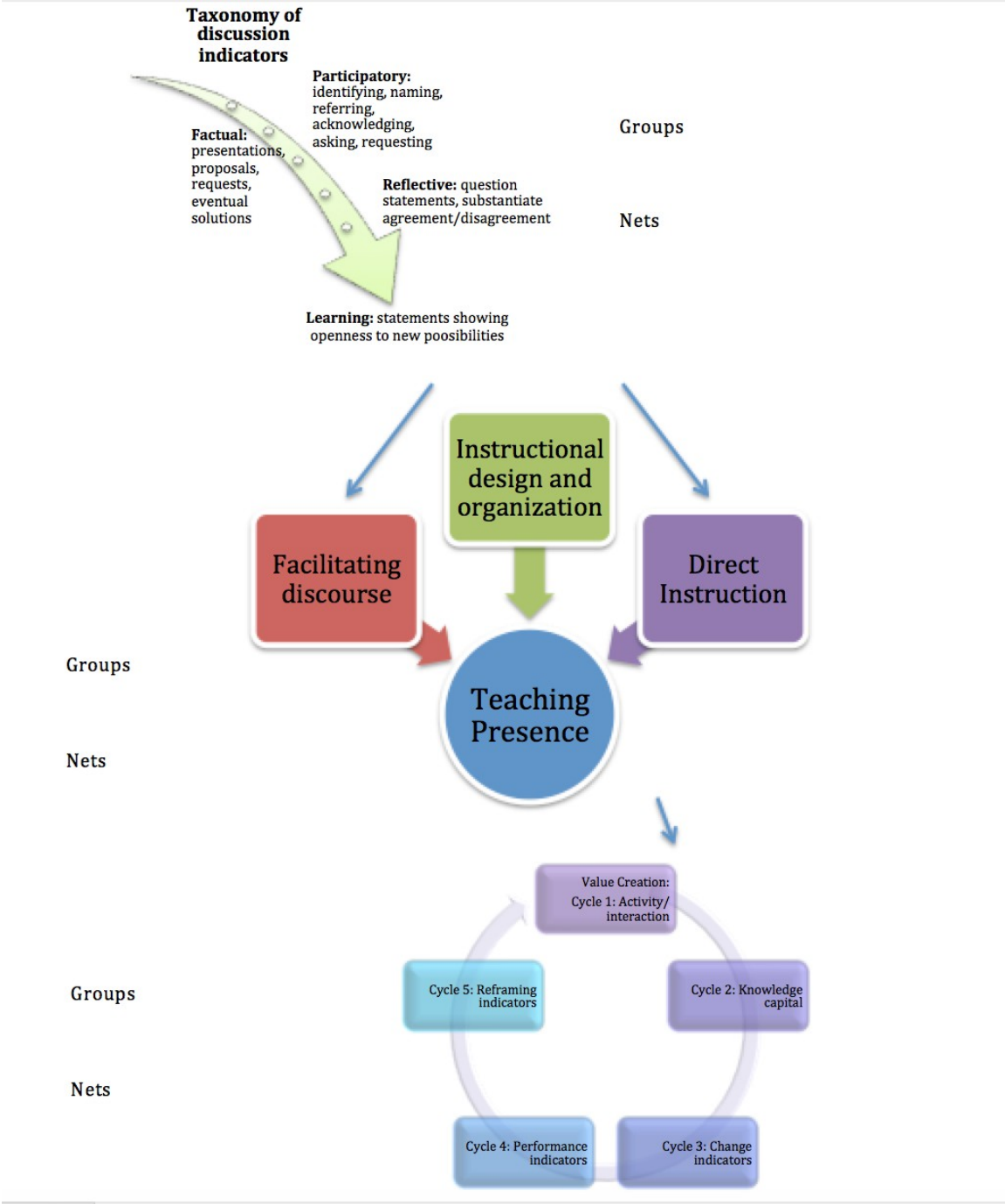


Figure 2. Concept map showing connections between the three research frameworks and groups, nets, and sets. Sets are not identified on the map, as the entire social format is a set.

Chapter 3. Research Design

Research Paradigm

> The perspective of the investigator always colors an investigation. As Karl Popper stated: Observation is always selective. It needs a chosen object, a definite task, an interest, a point of view, a problem. And its description presupposes a descriptive language, with property words; it presupposes similarity and classification, which in its turn presupposes interests, points of view, and problems. (Popper, 1963, p. 46)

All scientific inquiry, no matter what its ontological orientation needs structure such as that described by Popper. What makes inquiries unique is the point of view of the observer, how she sees and understands reality and how she situates those observations within her understanding of the world. Inquiries are tempered by what others have observed and recorded and, in this way, they are socially constructed. These social constructions, or conventions allow us to discuss what we see and experience, to exchange ideas, and to develop our knowledge of common experiences.

This investigation takes a naturalistic and appreciative inquiry approach to teaching presence on the Landing. While previous studies have used data from students to confirm or reject the presence of teaching indicators in courses, this study used observation as the basis for confirming or rejecting teaching actions on the Landing. A qualitative research methodology is appropriate for two reasons. First, the Landing is an intervention designed to alleviate students' sense of isolation and as such deals with transactional issues – the focus of qualitative research. While students' sense of isolation was not the focus of this investigation, the transactions which may or may not occur on the Landing, and the teaching actions displayed by the formal teachers and students are transactions and a form of engagement intended to support learning. Secondly, all but two previous studies (Anderson, et al., 2001; Arbaugh, 2007; Arbaugh, & Hwang, 2006; Shea et al., 2006; Shea, et al. 2003) using the teaching presence framework have been quantitative or have used mixed methods. They analyzed the data to look for the relationship between variables and quantified the results. This study sought to establish the extent of teaching presence on the Landing. Additionally, it situated teaching actions within net, set, and group environments on the Landing and investigated which teaching actions scaffold student actions to help them move to learning indicators as defined in the taxonomy of discussion indicators

(Booth & Hultén, 2003). In my rich K-12 face-to-face teaching experience, my teaching practice often benefitted from the observations of a disinterested, appreciative investigator. As Cooperrider, Whitney, and Stavros (2003) explain: "in its most practical construction, Appreciative Inquiry . . . is a form of transformational inquiry that selectively seeks to locate, highlight and illuminate the "life-giving" forces of an organization's existence". For this investigation, their words could be re-worked to focus on the learning-giving forces of an organization's existence. Teaching actions both by official teachers and by students can be observed by an investigator while being hidden from the participants because of their involvement.

In the most expansive sense of the word, universities are communities, ideally driven by the common pursuit of knowledge. In this sense, the Landing is a community. If teaching presence is shown to exist on the Landing and teachers are not intentionally using the community of inquiry framework, the value of the indicators as descriptors will be confirmed.

This study also looked at the nature of community on the Landing by adding observations derived from the conceptual framework for promoting and assessing value creation in communities and networks. These observations gave a picture of the nature of community in these courses on the Landing and showed users and the university what, if anything, happened to promote value both for students and instructors and possibly for the university as an organization.

A caution is necessary here. As a teacher with extensive experience, I declare a bias toward both teachers and students. I needed to be vigilant in recording teaching actions as they appeared in the courses and maintain my objectivity.

My bias for students can take the form of attributing greater participation than they are necessarily exhibiting, and so I was cautious in coding and data analysis. Keeping these biases in mind throughout the research supported a realistic view of teaching presence on the Landing.

This qualitative investigation was concerned with the reality of teaching courses delivered on the Landing. The question of what teaching presence looks like was answered using teaching presence indicators. The use of a taxonomy of discussion indicators and the value creation matrix and stories were used to verify and expand on the findings from Anderson et al.'s (2001) framework.

This chapter outlines the plan for this investigation of teaching presence on the Landing.

The statement of the study's purpose is followed by a reiteration of the research questions, and a discussion of the research design. A description of the participants in the study with sample sizes and selection criteria follows. Next is an explanation of how the teaching presence transcript assessment tool from the community of inquiry framework (Anderson, et al., 2001), the taxonomy of discussion indicators (Booth & Hultén, 2003), and the value creation matrix and story template (Wenger, et al., 2011) were used to investigate teaching presence on the Landing. Teaching presence within group, net and set environments (if it exists) was discussed as part of the investigation. Validity and reliability issues were addressed. A description of data collection procedures and analysis follows. A discussion of the delimitations of the investigation ends the chapter.

Purpose

This was an exploratory investigation of teaching presence in self-paced undergraduate courses offered on the Landing. It sought to examine the nature of teaching presence on the Landing and then to explore the value (if any) teaching presence offers participants, both those formally designated as teachers and those registered as students. The Landing was designed to mitigate the isolation felt by students studying independently. A unique environment, it presents the possibilities of connectivist affordances that are generally not used in traditional class groups. The following are the research questions, which inform the evaluation:

- To what degree is teaching presence evident on the Landing?
- How is teaching presence used?
- What value does teaching presence offer Athabasca University?

The following questions augment the research questions:

- How is teaching presence evident in groups, nets, and sets on the Landing, if at all?
- What indications are there, if any, that the affordances of the Landing prompt learning using the lens Booth and Hultén's (2003) taxonomy of discussion indicators?
- How does participation on the Landing help create a resource or resources that affect individual success and success for the organization?

Research Design

This exploratory study used Anderson, et al.'s (2001) tool for assessing teacher presence

in transcripts to establish the existence of teaching presence in self-paced undergraduate courses on the Landing. This tool is a proven measure of teaching presence in computer mediated threaded discussions (Shea et al., 2010; Shea, Li, & Pickett, 2006; Swan, 2004) and corresponds to the value cycles described by Wenger et al. (2011) in their value creation conceptual framework (See Appendix B for a detailed comparison). While not as widely used as the tool for assessing teacher presence, the value creation conceptual framework makes it possible to identify actions that create value for individuals and the organization. The use of both instruments allowed for teaching presence to be identified, analyzed and assessed for value provided to the participants and to the university. The additional use of the taxonomy of discussion indicators showed whether there is discussion, in the form of written examination or consideration of subject matter that prompts learning. The taxonomy of discussion indicators has shown that online discussion needs to move from factual contributions to reflective statements that include challenging and confirming others' contribution in order to move students to consider others' explanations and contributions as possible knowledge. This tool shed light on the teaching presence indicators of prompting discussion, identifying areas of agreement/disagreement, seeking to reach consensus/understanding, summarizing the discussion and diagnosing misconceptions. In addition to confirming the findings from Anderson, et al.'s (2001) tool, the use of Booth and Hultén's (2003) taxonomy illuminated teaching actions on the Landing by providing a measure by which to judge participants' actions. The intersection of these three frameworks facilitated developing an understanding of whether teaching presence occurs on the Landing, and how and where it was used to support learning, and how learning contributed to value for students, staff and the organization. The taxonomy in particular was helpful in identifying the nature of communication in these courses. It revealed that exchanges are in the form of dialogue rather than discussion.

By examining instances of teaching presence in various public aspects of the Landing, there were few ethical concerns due to the actors' purpose being public distribution, based on their decision to set the privacy control to public. However, the discourse was limited to members of closed, class groups. For these groups, I obtained permission from the group owner to become a member. Furthermore, students were notified that this research was taking place and I obtained permission from any participants whose quotes allow for personal identification. See Appendix F for examples of the notifications and permission letters. During coding, actors'

identities were masked by referring to each actor by an alphanumeric indicator.

Delimitations

This investigation looked at two self-paced undergraduate courses delivered on the Landing. It uses Anderson et al.'s (2001) original tool for assessing teaching presence in transcripts to allow for comparison to studies examining teaching presence in other forms of computer-mediated study. The choice of investigating two courses in the same discipline was also a delimitation. The use of courses in the same discipline minimized the effect that subject specific methodology had on the investigation. It also permitted some exploration of the effect of design on course delivery. The study was also delimited in terms of its boundaries. Value creation was confined to the influence the Landing had (if any) on individuals within Athabasca University and the organization itself. Influences beyond the organization (reputational value for example) were not investigated.

Research Sample

The investigation looked at postings addressed to and made by students in two self-paced undergraduate courses on the Landing. Two courses in the same disciplinary area were chosen to facilitate the investigation and to lessen the variables involved. This provided a rich database for the investigation and provided evidence of how design impacts teacher presence.

Athabasca University's continuous intake model, in which undergraduate students can begin a course on the first day of any month, with a six-month time frame for course completion, means that during the three months of this investigation, the population under study fluctuated. Some students had already begun the course, others were finishing, and a number of students completed their course during the investigation. AN invitation to tell a value creation story was extended to all course participants from the study time frame including each of the two teachers and one tutor. Five individuals (four students and one instructors) consented to complete value creation stories.

Originally, the plan was for individuals who completed value creation stories to have exhibited activity in one of the three teaching presence indicators and for those showing the highest levels of participation to be chosen should there be many participants to choose from. The two teachers and one tutor in Cases A and B were to be asked to complete value creation stories with the intention that these viewpoints would round out the picture of the teaching on the

Landing. The selection of three instructors was to avoid dichotomies. Only one teacher consented to complete a value creation story and so the research sample was changed.

The fact that many of the course participants had finished the courses several months prior to the beginning of the study and given privacy considerations, in the end, four participants consented to tell their stories, one instructor and a student from one course and two students from the second course. This response will be discussed further in the Chapter Six below.

Rationale for Selection of Instrumentation

The three instruments used in this investigation focused on different aspects of teaching on the Landing while offering a solid basis for comparison. Teaching presence indicators correspond to both the taxonomy of discussion indicators (Booth & Hultén, 2003) and value creation indicators (Wenger et al., 2011). Booth and Hultén's taxonomy of discussion indicators were used to investigate the nature of discussion in the courses. Participatory and factual contributions reflect actions that occur in information exchanges, while reflective and learning contributions reflect actions that occur during the construction of new knowledge. Anderson et al.'s (2001) indicators concerned with facilitating discourse outline actions for promoting discourse, defined as: verbal communication; talk; conversation; a formal treatment of a subject . . . the ability to reason or the reasoning process. (Collins Dictionary, 2015). The taxonomy added granularity to Anderson et al.'s (2001) indicators for facilitating discourse by outlining the progression discussion takes to lead to learning. Discussion overlaps discourse in the use of speech or writing to investigate a topic. The teaching presence indicators: creating a climate conducive to learning, encouraging discussion, and drawing in participants are equivalent to participatory and factual contributions. Identifying areas of agreement and disagreement, and seeking consensus or understanding could prompt reflective
contributions, which may lead to learning.

Correspondingly, similarities between the teaching presence indicators in communities of inquiry and the value indicators in value creation stories suggest that the value indicators for value creation stories can confirm indications of teaching presence on the Landing as well as indicate the value teaching presence adds to the Landing. While their knowledge focus is different – Garrison et al.'s (1999) communities of inquiry seek to expand what Laurillard (2002) terms second order, or academic knowledge and Wenger et al.'s (2011) communities of

practice and networks generally seek first order or experiential knowledge, both frameworks provide tools to identify teaching actions.

The use of these instruments allowed teaching presence to be investigated from three vantage points permitting triangulation as a means of establishing validity in the investigation. The reliability of the Anderson et al. (2001) framework was discussed above. Although Booth and Hultén's (2003) work has not been verified in other studies, I have used it informally in face-to-face teaching situations and found it a very useful tool. Although the value creation conceptual framework too, has not been widely replicated, its alignment with teaching presence indicators added detail to the picture of teaching presence on the Landing. In order to focus the value creation stories on teaching presence on the Landing, changes were made in the wording of the story template. Appendix D is a copy of the revised template. The codes for each instrument were applied to each post and the results were analyzed to discover relationships between and among elements of the teaching presence indicators, the taxonomy of discussion indicators and activity interaction indicators from the value creation framework. Instances of teaching presence were examined using Dron and Anderson's (2014, p. 82) "rules of thumb" to situate them as belonging to group, net or set actions. Instances of teaching presence, the relationships between the indicators and the situation of teaching presence in nets, sets, and groups gave a picture of teaching presence on the Landing.

Timeline

After approval from the Ethics Board, the investigation followed this timeline:

Week one (Oct. 18, 2016)- fifteen: arranged and finalized strategy for soliciting participants for value creation stories. See Appendix F for example of the notifications.

Week 15: notified teachers and students of study and explain purpose and measures

Week 15: finalized methodology for contacting students during study timeframe to solicit volunteers for value creation stories.

Week 16: began transcribing data

Weeks 16 - 17: clarified ethics approval parameters and arranged for e-mails to be sent to potential value creation story-tellers

Weeks 27 - 42: transcribed and coded posts for Cases A and B

Weeks 43 - 55: analyzed data and wrote Chapters 4 and 5

Weeks 56 - 66: revised Chapters 4 and 5 and wrote Chapter 6

Weeks 66 – 75: revised Chapter 6 and wrote Chapter 7

Weeks 75 – 79: revised and reformatted dissertation

Week 80: submitted dissertation

Weeks 83 – 90: revise dissertation

Week 90 – resubmit dissertation

Specific Procedures

Transcript analysis was used as the research technique. This provided consistency with the method used by Anderson et al. (2001). Cohen, Manion, and Morrison, (2007) detail ten steps in completing content analysis. The first step was to define the research questions. The questions used in this investigation are detailed above.

The second step was to define the text units' origin. Each message formed a text unit. Blogs and posts on the Landing and posts on the Wire as well as Site Tag Clouds, bookmarks, pin boards, Wikis and polls provided text for analysis and were coded three times using the framework for assessing teaching presence, the taxonomy of discussion indicators, and activity/interaction indicators from the conceptual framework for assessing value creation in communities and networks. They were also identified as belonging in a group environment, a set environment, or a net environment. Dron and Anderson's (2014, p. 82) rules of thumb for nets, sets, and groups were used to identify the environment in which each post resides. As this is a preliminary identification of these social formats in learning environments, the identification is rudimentary. One of the reasons for pursuing the identification of the formats is to encourage further research into the role they play in learning environments.

The third step pertains to defining the samples included in the study. Due to the brevity of the single word site tags, all tags were examined. Three months of posts on the Wire pertaining to the two courses studied were examined and blogs and posts from June,
July, and August 2016 were used. All bookmarks and site files for the courses for the same time frame were used in the analysis.

As a secondary use of data, the information gathered for this study was not used for its original purpose. Open groups are available to anyone logged in to the Landing. Membership in courses that are closed groups was sought. As a group member, access to data was available.

Before beginning data collection, group members were notified by a posting on the main page of the group site that that the research was begun on a given date. Particulars of the research, measures to keep participants anonymous, how the data was used, and the intended audience were part of the notification. Members were invited to express any concerns they have regarding privacy and were given the option of not participating. (See Appendix F for a copy of the notifications.) Students and teachers who were recruited to complete value creation stories were asked to complete the applicable ethics forms before their participation in this part of the research. All participants' identities were masked so as to protect their privacy in accordance with the Tri-Council Policy Statement (2010).

Step four of the procedure involved recording how the material to be studied was generated and by whom. Within the context of the Landing, this included categorizing the material as having been generated within a group, net, or set, by a formal teacher or a student and where on the Landing it appeared. Including student teaching actions was necessary to determine the extent to which students interact with each other in taking on teaching actions in this environment.

Step five was the definition of units of analysis. Message units both provided consistency with the original study (Anderson et al., 2001) and provided a unit that encompasses the various types of messages posted on the Landing. The Landing's design includes a range of messages from short wire posts limited to 140 characters to full blog postings. In order to ensure accuracy of analysis, messages were coded in more than one category. Indicators from both the framework for assessing teaching presence and the taxonomy of discussion indicators as well as the five sets of activity/interactions indicators from the conceptual framework for assessing value creation in communities and networks formed the basis for the codes used in the analysis.

The decision as to the codes to use (step six) was dictated by the behaviors that make up each category of teaching presence (Anderson et al., 2001), the discussion indicators in Booth and Hultén's (2003) taxonomy and the activity/interaction indicators in Wenger et al.'s (2011) value creation conceptual framework. These categories are descriptive and were discussed in detail above.

Step seven was deciding which categories would be analyzed. In this investigation, the categories are determined by the frameworks and the taxonomy used to indicate teaching presence. Perhaps a more relevant decision here was in which order the categories would be

analyzed and which framework would provide the over-riding structure for the analysis. The teaching presence indicators are the primary framework for this study. The taxonomy of discussion indicators served to elucidate the teaching actions that support student learning by moving students from collecting facts to constructing learning based on these facts. The value assessment framework (Wenger et al. 2011) confirmed the learning value of actions on the Landing for students and instructors and then by extension to the university as an organization. These instruments show a high degree of correlation as indicated in Appendices A and B. This correlation allowed the original categories to be used initially during data collection with the categories in Booth & Hultén's (2003) taxonomy and Wenger et al.'s (2011) framework being subsumed into Anderson's et al.'s (2001) framework as the data is analyzed.

Step eight coded and categorized the data collected. The first coding used teaching presence indicators and revealed the frequency of teaching actions as well as illuminating any patterns of teaching actions that may occur. Next, Booth and Hultén's (2003) discussion indicators were used to reveal the depth of discussion in exchanges and highlight teaching actions, which prompted learning. Lastly, the action/interaction indicators identified the types of value within the teaching actions. The intersection of various codes allowed for the development of nodes (Cohen et al., 2007, p. 479) to form a picture of teaching presence on the Landing. The criteria used the specific indicators detailed in these frameworks and the taxonomy and allowed for structuring content analysis. (Cohen et al., 2007, p. 480). The filtering characteristic had the advantage of eliminating extraneous information and allowed pertinent text to be examined. The data was coded for the incidence of the concept in order to indicate the importance of the concept in teaching actions. In order to capture and accurate picture of teaching actions, code was applied to text with similar meanings to the indicators as one teaching action can be expressed in many ways. In order to facilitate coding and remain true to the indicators, shortened forms of the verbs and their object were used as the descriptive labels. These labels were applied after the data was collected and was scored using response counting to determine the frequency of a given action. After coding and categorizing the data according to the indicators in each framework and the taxonomy, the data was ready for analysis.

Table 2 below, shows the teaching presence indicators used the framework for

communities of inquiry.

Table 2
Teaching presence indicators

Categories	Indicators
Instructional Design and Organization	• setting curriculum • designing methods • establishing time parameters • utilizing the medium effectively • establishing netiquette
Facilitating Discourse	• setting a climate for learning • drawing in participants, prompting discussion • identifying areas of agreement/disagreement • seeking to reach consensus/understanding • assess the efficacy of the process • encouraging, acknowledging, or reinforcing student contributions
Direct Instruction	• present content/questions • focus the discussion on specific issues • summarize the discussion • confirm understanding through assessment and explanatory feedback • diagnose misconceptions • inject knowledge from diverse sources, e.g. textbooks, articles, internet, personal experiences (includes pointers to resources) • responding to technical concerns

Adapted from: Assessing teacher presence in computer conferencing transcripts.
T. Anderson, L. Rourke, W. Archer, and R. Garrison, 2001, Journal of the Asynchronous Learning Network 5(2)

Step nine was the data analysis. The data was analyzed to examine the frequency and nature, and position of teacher presence on the Landing. Actions described by Booth and Hultén's (2003) taxonomy and Wenger et al.'s (2011) framework were correlated with teaching presence indicators to form a picture of teaching actions. It was also analyzed to reveal which of the design features on the Landing exhibit the highest levels of various forms of teaching presence. When coding was complete, and participant storytellers had submitted their stories, the measures of value creation and the value creation stories were examined to obtain a picture of how teaching presence contributed (if at all) to value on the Landing. Wenger et al.'s (2011) concept of proxies was considered in categorizing messages from value creation stories to maintain the

intention of their concept.

The tenth step – summarizing – brought the data together with personal observations and experience to reveal teaching patterns on the Landing. As an appreciative inquiry, my extensive teaching allows me to recognize successful teaching techniques. These observations combined with the data collected was used in the next step of the investigation – determining learning value for students and teachers.

Rigor – Methods of Verification and Trustworthiness

Cohen, Manion, and Morrison (2007) state that validity in qualitative research needs to be true to the research paradigm being used. Qualitative research seeks to understand and so uses methodologies that differ from those used in quantitative research. The approaches that were used in this qualitative study to support verification and trustworthiness and are discussed below.

Internal validity was ensured by the triangulation of the two frameworks and the taxonomy of discussion indicators. Disclosure of my bias toward finding teaching and learning also enhanced internal validity by recognizing researcher bias.

Reliability was enhanced through the explanation above of my position with regards to the study, and by the use of triangulation.

External validity was enhanced by thick description, rechecking the data and documenting the process, and the use of a data audit which is discussed below.

Two hundred and 400 level self-paced computing courses showed robust presence on the Landing and so were chosen for the investigation to allow for a three-month study. June, July, and August in 2016 provided 529 posts – 360 from Case A and 169 from Case B. These posts included one instructor and a tutor in Case A and the instructor in Case B. These courses have used the Landing for partial course delivery for several years although the official course site is in Moodle and due to the university's continuous enrollment format and the self-paced nature of the courses, it is extremely rare for two students to be at the same place in their course work at the same time.

Each post was coded three times, once for each framework. To avoid confirmation bias, the order used to code the posts was reversed halfway through the posts for Case A and again halfway through Case B. Many of the posts were coded for more than one indicator. This

reflects the richness of these posts and the nature of this qualitative, appreciative investigation. Multiple coding for some posts illuminates the complexity of teaching presence and points to the power of the instructional design to create a climate that fosters a productive teaching presence.

Triangulation was part of the research design. The framework for assessing teaching presence (Anderson et al. 2001), the taxonomy of discussion indicators (Booth and Hultén, 2003) and the framework for assessing value creation in communities and networks (Wenger et al., 2011) measured different aspects of teaching actions in the self-paced undergraduate courses studied. The intersection of the indicators is detailed in Appendices A and B and indicate internal consistency as comparable actions are being measured from different points of view. The degree to which actions are measured by all of the instruments indicate the extent of their presence on the Landing. Although actions are expressed in terms of teaching presence, their appearance indicated by comparable indicators in the taxonomy and the value creation indicators and stories validates the teaching presence indicators. Investigating teaching presence through the lens of discussion in terms of prompting learning and actions that create value provides insight into the complexity of actions in the undergraduate courses in the study.

Summary

The instruments used in this investigation, all deal with achieving learning, either through teaching actions or through revealing the value of actions to support learning. The measure of teaching presence on the Landing gave insight into the affordances the Landing provides for teaching in self-paced undergraduate courses which supports learning. Booth and Hultén's (2003) taxonomy added granularity to the teaching presence indicators and served as a tool for identifying teaching actions that prompt learners in self-paced courses to deepen student learning. Wenger et al.'s (2011) framework examined learning value at several levels in networked communities and served as a tool to investigate the learning value teaching presence has for various actors associated with the Landing. As Laurillard (2002, p. 23) reminds us "without the processes of decontextualization, and formalisation, knowledge remains situated and uncommunicable".

Chapter 4. Analysis of Findings in Case A

This investigation centers on the teaching presence in two self-paced courses partially offered on closed course sites on the Landing. The primary research question: How is teaching presence evident in self-paced courses on the Landing? is augmented by a second question which uses Booth and Hulten's (2003) taxonomy of discussion indicators to examine how discussion supports teaching presence and the third question which measures learning value in the teaching presence using Wenger, Trayner, and de Laat's (2011) value creation framework.

The analysis will follow the same pattern for each of Case A and B. To begin, I will describe the course design and details of the course site. Next, I will discuss the results of content analysis for each of the teaching presence indicators, discussion indicators and value creation indicators, present in postings in each of the courses. The content of two value creation stories for each of the cases will also be discussed. Then, I will discuss the presence of groups, nets, and sets in the course postings. Posts reflecting the transactional nature of teaching presence in both cases and a brief summary of the data for the case follow.

The indicators will be discussed in the order in which they emerged in the content analysis – the teaching presence indicators with the greatest number of posts first, moving on to the indicator with the least number of posts.

Case A

Case A is a first-year undergraduate course with 500 members – current and past students who continue to be members of the course group. It is a closed group, meaning that membership rights must be granted by the course owner, the professor who is responsible for the course. There is also a tutor to whom students submit assignments and who completes the administrative duties for the course. During the three months studied, June, July, and August of 2016, 50 students and staff posted to the course site and these posts constitute the basis for the investigation of this case. This represents just under 10% of the total course membership.

When members log onto the course group site, they see a brief explanation of the course objectives, the URL for the syllabus, and for potential members, instructions to request group membership for permission to join. The professor's e-mail is included in case of difficulties obtaining access or other concerns. The site is described briefly, tags for the course site, the type

of group are also detailed, and its website address is also detailed.

The website address: http://athabascacau.ca/syllabi/comp/comp.266.php (available to group members on the Landing) takes the member to the course syllabus which outlines learning outcomes related to the programming skills developed through the course. An outline of the seven units comprising the course follows. The units which require programming using html and css codes are weighted at 15%, the javascript writing unit is weighted at 30% and the other four units are weighted at 10% each. The weighting reflects the relative importance of each unit in the portfolio of work the student creates in the course. An explanation of evaluation follows the outline. In addition to explaining the portfolio basis for the course, expectations for student contributions to the site are detailed. Sharing and support for other students is listed as evidence of having met learning outcomes.

Students are also required to estimate their grades which students are advised, may or may not match the tutor's evaluation. Advice that the course materials are entirely online and consist of materials provided by the instructor and tutor as well as material discovered and shared by students follows. In both the Special Course Features and the Special Instructional Features sections of this page, students are encouraged to share their work through the use of social tools, such as "blogs, wikis, bookmark sharing, file sharing and discussion spaces". This design feature is intended to reduce isolation and encourage students to enable shared learning. The problem-based nature of the course is highlighted, and students are reminded of their responsibility for discovering their own methods of achieving their desired results, increasing the importance of mutual support.

Returning to the main page, the sidebar on the right, lists the types of activities in which group members can participate. These include group activity, blog, bookmarks, discussion, featured content, files, polls, recommended content, webinar, wikis and wire posts. The links are active and take the participant to the type of post listed. Below these buttons is a field titled "Search in this group". This allows the user to search for a member in the group and find a compilation of the contributions that person has made to the site. Group administrators are listed next. Clicking on the picture allows the member to follow the person, contact them by

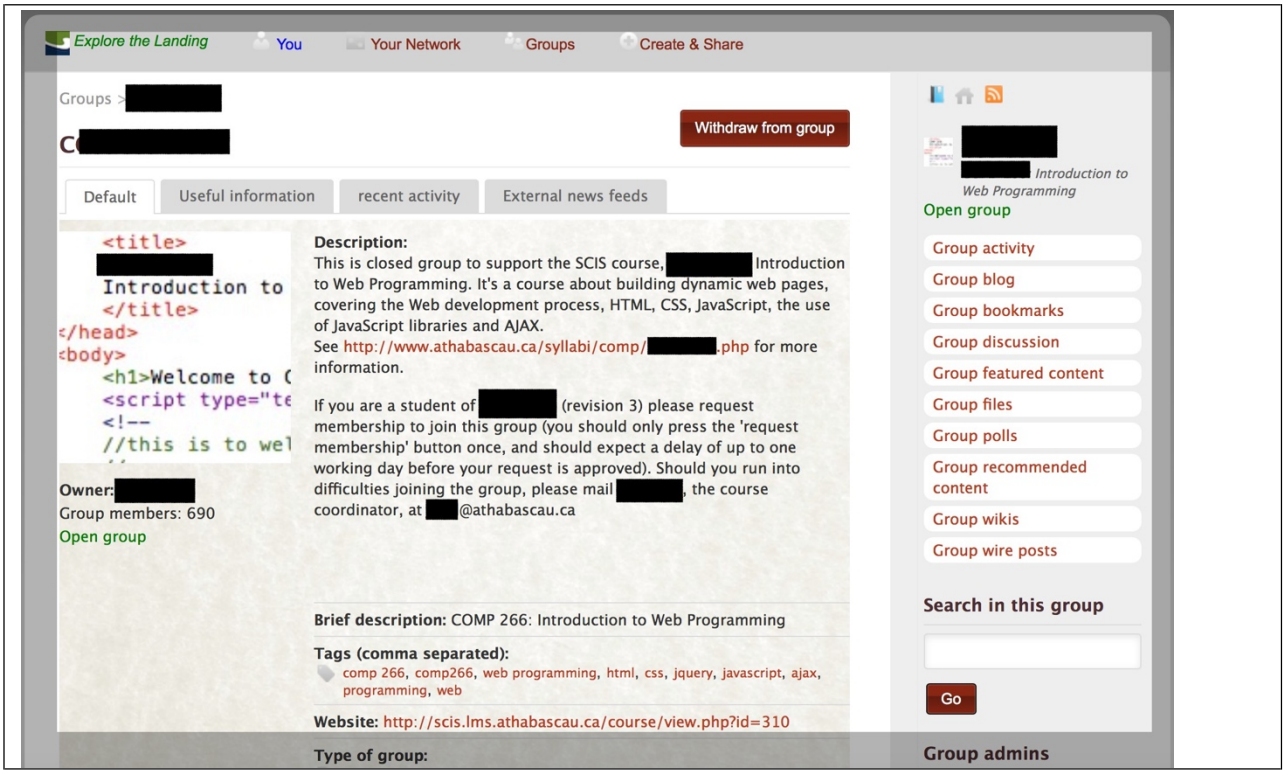


Figure 3. Partial screenshot Case A. This page gives a description of the course, tags that identify work related to the course, and in the right sidebar gives access to the various areas available for participants' use.

e-mail, see their activity, report them, or send a message. Group members are listed in the same way below, group notifications and the member's status are next, followed by links to the pages where each of the posts containing tags for each unit is listed. The main page area contains a column previewing latest group activity with links to the complete contribution, a field for access to useful tips, Wire posts – Twitter like messages, featured content, group wikis, random content from the group, files and forums.

Moving deeper into the site to the group activity page, a member can choose to find posts from a particular student. The posts are listed chronologically with the most current post at the top of the page. These posts give the student name, the purpose of the post – new discussion topic, blog post, file, for example. Clicking on the student's name will take the user to the student's home page with their self-created user profile. Clicking on the colored post title takes

the user to the entire post. A member can also search for member activity site-wide, activity per member and activity statistics.

The group activity pages of the site were used to create a preliminary list of posts made during the timeframe of the study. Once this preliminary list was compiled, I was able to use the activity per member site to access almost all of the activity by each member. Members who only posted replies (one member) did not appear on the activity per member pages. These posts were used to investigate the incidence of teaching presence indicators, the taxonomy of discussion indicators and the value creation indicators. The following section discusses the findings of this investigation.

Teaching presence indicators. Prior to examining the indicators, it is necessary to note that the teaching presence indicators are actions that both formal teachers and students perform. The action of distributing these actions between instructors and students is one aspect of flattening the architectural hierarchy which traditionally has set conditions for the teacher to transmit information to students.

Direct instruction. The majority of the posts in Case A illustrated direct instruction indicators. Direct instruction – detailed in Anderson, Rourke, Archer, & Garrison, (2001) as the sharing of subject matter knowledge with students includes presenting content and questions, focusing the discussion on specific issues, summarizing the discussion, confirming understanding through assessment and explanatory feedback, diagnosing misconceptions, injecting knowledge from diverse sources, and responding to technical concerns. In an open environment such as the Landing, sharing, through posting to the course site, is not restricted to an action directed toward students. It is an action where sharing is student to instructor, student to student and instructor to student. This finding echoes Garrison et al.'s (1999) original description of direct instruction and the findings of Anderson et al. (2001). These studies describe teaching presence as a role shared by teachers and students. The following paragraphs describe how the direct instruction component of teaching presence is evident in Case A.

Table 3

Teaching presence indicators - direct instruction coding references per participant

Direct Instruction 1299 coding references	Instructor coding references	Student coding references
Coding References	55/1,299	1,244/1,299
Present content, questions for consideration	11 /368	357 /368
Confirming understanding through assessment and explanatory feedback	7 /362	355/362
Injecting knowledge from diverse sources	19/294	275 /294
Responding to technical concerns	7/193	186 /193
Focus discussion on specific issues	2/38	36/38
Diagnosing misconceptions and errors	9/43	34/43
Summarize the discussion	0/1	1/1

Student contributions in a course where students are given the agency to choose their own project and then to show they have met learning outcomes through the development of that project, exemplify direct instruction indicators. Of the 1,892 coding references in Case A identified as teaching presence indicators, 1,299, or 68.66% were direct instruction indicators. The following paragraphs detail how both instructors and students use each of the indicators in this category.

Present content, questions for consideration. Presenting content, questions for consideration and confirming understanding through assessment and explanatory feedback are means of relating information. On the surface, presenting content is a way of putting information into the course. In this particular course environment, presenting content is also a means of showing the instructor that course outcomes are being met. Presenting questions for consideration can be either a request for information or a way of introducing alternative

understandings of the content. There were 368 coding references for this indicator with instructors making 11 of the references (2.98%) and students making the 357 references or 97.01%. Seven of the instructor posts gave information about text editors, browsers, and protocols for the operating systems students are likely to be using. Two posts suggested specific websites for students to access for example: "Try Filezilla - https://filezilla-project.org/ or browse http://landing.athabascau.ca/ bookmarks/group/40166/all#120189 for alternatives." C1-I1

One post reflected on course design and its transferability to a different platform and one was a disclosure concerning mixing programming languages with a suggestion for knowing when to use each. In line with the course design, the instructors do not supply students with a list of content to study or questions to answer. Instructors do present content in response to student queries and problems posted to the Landing. An instructor comment encouraged students to search out information to share. "There are examples . . . to be found around the web . . .". C1-I1 However, most student queries are answered either by other students or students themselves as they search the web to solve their learning problems.

Presenting content, questions for consideration in the context of posts in this course site is often, again, a tool for students to present their learning both as proof of its existence and secondarily, as a means of sharing to help other students in a growing repository of knowledge. Students suggested content even when they did not use it in their own work as evidenced by this student post: "I found this cool tutorial to make scattered clickable polaroid images. I didnt (sic) use it on my site because I was becoming too overwhlemed (sic) with details, but it is a neat one that I would like to try using again in the in the future! http://zurb.com/article/305/easily-turn-your-images-intopolaroids-wi" C1-S19

There is ample evidence that students took the advice to share their resources found on internet to heart and the Landing has a growing repository of sources and tools to support student learning. A student commented: "But with some help of: stackoverflow.com I was able to get it right" illustrating both the achievement of a learning outcome and leaving content for subsequent students to consider. Bits of content like this are the stigmergic traces (signs left in the environment, Dron, 2007b) left behind by members that can inform future students' work. Longer posts present student thinking in greater detail and allow them to verbalize their thought processes and consequent actions.

Confirming understanding through assessment and explanatory feedback. As the course site details, tutors do not provide assessments at the end of each unit as in traditional courses. Instructors and students posted a total of 362 coding references for this indicator of which just under 2% were attributed to instructors (7 references) and 98% (355 references) to students. The instructor posts affirmed student requests and clarified learning expectations as shown by this post from the instructor in Case A:

> Yes, I think you have captured the essence of the process! It's all about giving you control and agency, plus a relatively authentic experience using the tools and learning methods that programmers use and being here to help if you need it. C1-I1

As students develop a website as a vehicle for learning html, css, and javascript, they receive immediate, formative feedback when their website either performs as expected or does not. If the website works as the student expected based on the design, the student has successfully completed the programming. If the website does not perform as expected, the student realizes immediately that the programming is not effective and needs to be revised. This form of immediate formative feedback allows students to diagnose their misconception, adjust their work, and describe the process in their learning diary submission, allowing current students access to their thought processes and design strategies as well as leaving stigmergic traces for subsequent students to follow.

Scaffolding within the course provides the support that students need to self-assess their work and make corrections accordingly. This quote illustrates how a student assessed his problem and solved it. "Some code was interacting with other code in a way I didn't quite understand, I was accidently using non-existant (sic) code and in general biting off more than I could chew". C1-S22 The role of posts explaining thought processes and work, then, is to provide evidence of having completed the learning outcomes and to provide learning material for other students. These outcomes are not part of teaching presence indicators and will be discussed in greater detail in the discussion chapter of this investigation. The process of explication solidifies the learning for the student and allows the student to assess their own work fulfilling a role traditionally filled by teachers.

Injecting knowledge from diverse sources. Injecting knowledge from diverse sources, another traditional role of the teacher as knowledge keeper, is an indicator that reflects the flat architecture of this course. The architectural metaphor describes the power structure inherent in the traditional course design. In a traditionally designed course, with an objectivist epistemology, the teacher is the knowledge holder who controls the sources and validates the knowledge to which students are exposed. This approach to design places the instructor at the top of a pyramid by right of his position above the students as the expert knowledge holder. The design of this course, places students on par with the instructor in terms of access to knowledge, flattening the architecture of the course by distributing the power resulting from knowledge acquisition to all participants in the course rather than leaving it solely with the instructor.

Similar to presenting content, injecting knowledge from diverse sources is a course recommendation, as evidenced by the percentage of instructor posts to student posts – 6.5% of coded references (19 of 294 references) were posted by instructors and 93.5% of coded references were made by students. While many students post the same work in terms of content in posts and websites, again in their efforts to show having met learning objectives, there is learning that is unique. Instructor and student suggestions both named URLs for the sites they were recommending. The instructor made this suggestion: "Try Filezilla - https://filezilla-project.org/ or browse http://landing.athabascau.ca/ bookmarks/group/40166/all#120189 for alternatives". C1-I1 Similarly, this student suggestion named a website but mentioned the site because of its usefulness in supporting the student's learning: "I instead decided to use the code at http://themarklee.com/2013/12/26/simple-diyresponsive-slideshow-made-html5-css3-javascript/ because of its in-depth explanation at each step." C1-S17

One piece of evidence that a student has met the course requirements is showing "supporting evidence, including . . . resources shared". (http://www.athabascau.ca/syllabi/comp/comp266.php). The effect of this requirement, beyond students gaining familiarity with the resources available in a very dynamic subject area, is accumulation of learning artifacts that subsequent students can access for their studies.

Responding to technical concerns. Students extend this sharing in their responses to the technical concerns of fellow students. Although this has traditionally been the role of the instructor, in the learning environment of Case A, students are encouraged to help other students. Instructors made only seven of the 193 coding references or 3.6% of references for this indicator.

The posts included confirmation of hardware for use in the course, “A Mac should work fine” C1-I1 and a lengthier analysis of why a website is not working: “This is very odd . . . something like links turning into a menu could not happen automatically . . .” C1-I1.

The site creator’s design decision to make “help given to others” count in the students’ evaluations, indicates that they are to take responsibility for aiding and supporting other students’ learning. For example, this post illustrates how a student was able to make suggestions for correcting a problem from looking at the first student’s code. “From your code, it seems that you have put the image named "Hole15.png" in the folder "Images". Is this the case? If so”. C1-S31 In this case, the formative assessment both helps the student asking for help to solve the problem and shows evidence of the helpful student’s increased confidence in her ability to troubleshoot and help other students. This signals progress for both students and illustrates the flat hierarchy of the course structure. In responding to technical difficulties students also diagnosed their own problems, gaining valuable experience in troubleshooting.

Diagnosing misconceptions and errors. Instructors posted 20.9% of the coding references for this indicator while students posted 79% of the coding references. By designing the course to encourage students to diagnose their own (and others’) misconception and errors, the course creator both allows students to become experienced in troubleshooting and allows them to develop a repository of corrections that will help subsequent students with their learning. When necessary, the instructor intervenes to clarify student understanding as seen in this post: “Always test in multiple browsers, and always do a full refresh on the browsers that you do use whenever you make changes. Even when conditions are good, sometimes, things just fail to load, and browsers remember things.” C1-I1

Student posts showed evidence of diagnosing both their misconceptions and errors. By giving students the responsibility for the course, the designer uses the nature of the feedback qualities inherent in programming to allow students to increase their diagnostic skills. The nature of the coursework is such that students get immediate feedback about the accuracy of their work from the work itself. The improvements made to the website because of the code added at a given time either works in which case the student was successful, or it does not work as expected, in which case the student must diagnose a misconception or an error before being able to continue with the site development. This immediate formative feedback naturally pushes students to retrace their thinking in order to discover where their thinking was

incorrect or where they made an error. This student expresses that experience this way: "I didn't realize that in order to implement it in CSS the way I wanted it, I would have to change it to an unordered list (so I did)." C1-S28

Students must find strategies to solve the problems they encounter while developing their projects and one of those strategies is to put a discussion of their experience on the course site for others to see and perhaps comment on. Students discuss difficulties they have found with aspects of the course and by focusing on the aspects that have given them trouble, they are able to recognize problem areas and address them by either correcting them right away or soliciting help from students or an instructor. A student illustrates this point with his comment:

> I originally thought that I would have to download this huge 30 page document, with numerous folders so I was quite confused when I wasn't able to download anything. After spending some time on the landing and looking at other people's submissions, I learnt that a library was one page of code, with many, many lines. C1-S44

This post illustrates the student's recognition of her misconception and her strategy for correction.

Focus discussion on specific issues. Focusing discussion on specific issues was evident in only 38 coding references. Two of the coding references were from posts made by the instructor. The remaining 36 coding references were from posts made by students. Although a small category, it did show evidence of prompting students to take their own learning deeper. One student replied to a fellow student: "I was curious about the code you found so I did a bit of research" C1-S28 and went on to explain what had been found and how it could help the other student. Another student focused her discussion of the challenges her work presented with this introduction "I had a few things challenge me on this unit." C1-S6 Brief, focused discussions like this increase student agency both to comment on her own work and to add to support others' learning.

Summarize the discussion. This indicator had only one coding reference. This lack of presence reflects the course content and the fact that students design their own methods and diagnose their own errors. The reference: "Summery (sic) In the end I really enjoyed the whole unit and learned allot (sic) from it." C1-S-14 was used to end a final unit entry and represents netiquette to a greater extent than a summary of discussion.

Instructional design and organization. Instructional design and organization was very deliberate for this course on the Landing. Dron and Anderson (2015) discussed the application of principles employing strategies such as using groups, nets, and sets in a flat architecture to give students agency and control, particularly over their privacy settings. In this environment, students use many of the same strategies to promote their own learning. The instructor explained: "We put a lot of effort into designing a pedagogically useful process rather than filling the course with unnecessary content, but that process can be quite intricate at times." C1-I1 He elaborated further "see how each unit builds on the last. That's crucial to the design of the course and to its assessment" C1-I1 Addressing assessment and possible cheating in the course, he continued "allow us to see the process and your growth through the course (which is one of the many mechanisms we use to eliminate some kinds of cheating as well as to understand how you have approached the problem)". C1-I1 Much of the design work in the course takes place prior to course delivery and so is not explicit in the posts on the Landing. The following descriptions are based on the design activity evident in actions on the Landing which match descriptions of the instructional design and organization indicators and from the instructor's value creation story. There are also design activities describing student actions concerning the design of their own course work – in this course – a website.

Table 4
Instructional design and organization indicators – coding references – Case A

Instructional Design & Organization	Instructor coding references	Student coding references
442 coding references	45/442	397/442
Designing methods	9/253	244/253
Establishing netiquette	17/96	79/96
Utilizing the medium effectively	9/68	59/68
Establishing time parameters	4/16	12/16
Setting curriculum	6/9	3/9

Designing methods. Designing methods or learning activities for the course has traditionally been thought of as exclusively the domain of course creators and instructors. In Case A, both Moodle and the course site on the Landing are used as learning environments. Due to the research topic – teaching presence on the Landing – data from the Moodle site was not included. Information in the FAQ file was also not included in the analysis, although it does represent direct instruction. In this course, students participated in instructional design on several levels. While the course creator designed on a macro-level, students designed on a micro-level. In part because the course creator worked on a macro-level which is not obvious in posts on the Landing, only eight of the 253 or 3.16% of the coding references were attributed to instructors. Students accounted for 245 of the 253 or 96.8% of the coding references. Both levels will be discussed in detail in the following paragraphs.

On a macro-level, the course designer, in focusing on process rather than content allows students the flexibility to use their own projects as vehicles for their learning. The course designer flattened the course architecture and increased student agency to allow for individual control, as well as to introduce learner to learner networking opportunities not available in traditional course design. In flattening the course architecture, the designer gives agency to

students to control the processes they use to support their learning. In one post, the instructor explained that the course was designed with an emphasis on "a pedagogically useful process" rather than content and in another post described the need for students to produce deliverables both for assessment purposes and for "posterity". He elaborated, explaining that the design was meant to support the development of good thinking habits, to ease the learning process and to let the instructor and tutor see how the student is thinking through the design of her work and how she has grown her skill set.

The design element of asking students to discuss successes and challenges leads students to write about diagnosing misconceptions and errors (a direct instruction indicator). In making this a design element, students are required to reflect on their thought processes and design procedures. This action includes reviewing what they have done and analyzing the success or failure of their design. If there was an element of failure, the student is required to account for how this was overcome, reinforcing their successful correction.

At the micro-level of instructional design and organization, students, with minimal input from instructors, decide what their project will be, what elements would be incorporated in it and how they would design (or modify) code to make the site functional as they had planned. By designing methods for making their website function, students moved their knowledge to reality. One student described how designing changes prompted what might be a change in process: "I spent a lot of time 'floundering' and struggling with how to actually make changes to my code to embed jquery widgets. This was solved by investigating demos on the jquery site. I would have viewed this first and taken a more holistic approach to this unit." C1-S10

In addition to strengthening their own ability to design, students also support other students in their growth efforts. This student turned to fellow students for help with style sheet options: "After some group help from The Landing, I found the problem". C1-S19 In leaving stigmergic traces, students are illustrating how the course can be approached and how future students can complete their projects. So, the personal learning methods designed by these students leave indicators for future students as to how to approach a different type of learning. As this student put it: "Looking forward to learning from everyone since it is encouraged, and so far I've learned a lot through reading other peoples' diaries". C1-S24

Establishing netiquette. Netiquette, etiquette for networks, can be distilled to one behavior: "Remember the human". (Sturges, 2002) With a deliberately flattened architecture and

increased student agency, the role of the instructor in establishing netiquette becomes more discrete. Most of the instructor posts coded as establishing netiquette – 17 of a total of 96 coding references – over 17% of the total references, concerned either welcoming comments or comments that model the flat architecture of the course site. Eleven of the 17 comments – just fewer than 65% - were simple welcomes or comments on student comments. Of these, seven comments included the student's name. Almost 18 % of the instructor posts were indications to the student that the architecture of the course is not the traditional course format where the teacher establishes the content and the methods whereby students' will practice and demonstrate their learning. Only one of the 17 coding references was help for a student needing guidance.

The instructor's role in this environment is perhaps subtler than that of an instructor in a more traditionally designed course. The use of student names personalizes the site and increases student sense of belonging and of being valued. Categories of social presence and elements of netiquette, in the sense of remembering the human increase the likelihood that students will achieve their learning outcomes as Garrison et al. (2000, p. 96) state: "When social presence is combined with appropriate teaching presence, the result can be a high level of cognitive presence leading to fruitful critical inquiry".

Briefly using the lens of social presence to investigate the nature of using netiquette or as Sturges (2002) puts it: remembering the human, in Case A, the instructors use affective responses slightly more often than interactive or cohesive responses. The affective responses include seven welcome messages, two messages expressing emotion, and three disclosures. These responses signal the student that the site is an open place where transactional elements are important. They also reveal the instructor's humanity, increasing the sense of membership in a social format in which traditional group membership is not possible. The social nature of the site is disconcerting for some students and the strategies the instructor uses are able mitigate this. This is exemplified in a student response to the instructor's post reminding students of the location of the course requirements: "Knowing how my portfolio would be marked and what I needed to accomplish to be successful in this class was very beneficial as I came in knowing nothing." C1-S46 The instructor responses also encourage interaction (and very subtly encourage students' participation) on the site.

Part of the design element of giving students agency is giving the freedom to contribute beyond adding course content to the site. Once netiquette has been established, students are

empowered to reach out to others to connect on an emotional level: “I’d love to hear from others who are further along in this process – is that what it feels like to you?”. C1-S28 Netiquette humanizes what could be a very emotionally sterile atmosphere and promotes connection with other students in a spirit of camaraderie. As a contributor to teaching presence, establishing netiquette promotes a sense of emotional safety, which is necessary for learning and eases the anxiety of working in an unfamiliar environment. A few students also make use of informal means of communication indicating their sense of belonging in the course. Emoticons and expressions of common courtesy with comments such as “in hindsight I would have just made one (submission folder) – sorry! Hope it’s not a problem,” C1-S19 indicate student ease with the site. For many students, seeing elements of netiquette in course posts can be the deciding factor in reaching out to make connections, which are essential to the success of an e-learning commons.

Utilizing the medium effectively. It could be argued that anyone who successfully posts her work or a message on the course site is utilizing the medium effectively. As Dron & Anderson (2015, p. 267) point out in Teaching Crowds, the interface with the course site is “unintuitive, at least in part because of the ongoing confusion . . . of group, net, and set social forms”. Given this “ongoing confusion” those getting their work posted to the site are using the medium effectively – often with the example of previous students – as one student explained: a library was one page of code, with many, many lines.” C1-S44

There were 68 coding references for this indicator with nine (13.2%) of the references made by instructors and 59 (86.76%) of the references made by students. These coding references reflect utilization of the medium that stand out as noteworthy. Instructors and students alike alluded to the effectiveness of the medium rather than commenting on its utility outright. Many of the allusions were to the support they received by using the medium as a resource for information. Comments such as: “The documentation on the Athabasca website also helped a bunch!” C1-S14 and “I searched on the landing for people having the same issue” C1-S37 are examples of the medium containing information to help and support students in their learning. Students both asked for help and gave it, showing the reciprocal nature of the environment and illustrating characteristics of networking. The medium also supports netiquette in allowing students to reveal their personalities. One student posted “I found this cool tutorial” C1-S19 which besides fulfilling the course requirements of sharing information and helping

other students, reveals her enthusiasm for the topic.

In modeling an open, welcoming attitude and encouraging an atmosphere where both the instructor and students are learning, the instructor is creating an atmosphere in which students feel comfortable expressing themselves in terms of academic content, and social and emotional comments. This level of informality (due in part to the flattened architecture of the site) contributes to the student's sense of belonging. This increased social presence, modeled by the instructor can lead the students to a greater enjoyment and thus an increased likelihood of remaining in the course. (Garrison et al., 1999).

Establishing time parameters. Participants made 16 coding references to establishing time parameters in Case A. Instructors made 25% of the references and students posted the remaining 75% of the references. Institutional policy establishes the time parameter for the course, but within the course site, both instructors and students set time parameters. Instructors mentioned a rough timeline for further development of the course and for submitting marks to the coordinator. Other posts referred to how time impacts course completion.

Of the 12 remaining posts, seven made by students related to time constraints: "limited time" (three references), "I ran out of time" (two references) and two posts wishing for more time to learn java-script. These posts reflect the challenges all students face, but ones that seem to be especially characteristic of studying at a distance.

Student posts mentioned learning tasks taking more time than described in the course syllabus. "This portion of unit one took much longer than the suggested ten hours listed for the entire unit". C1-S16; "I took much more time on this unit that (sic) I initially anticipated". C1-S17; "I've spend (sic)over 40 hours now". C1-S50 This could be due to increased engagement in course activities, individual student work habits or even a miscalculation of how long an activity would take to complete.

Several students expressed frustration with their time management skills in posts similar to this: "the reasoning is simply that I did not leave myself enough time to complete the unit" C1-S17 and in a post that carries over into the indicator diagnosing misconceptions: "Having, again, put myself in the position of having one week to complete the course". C1-S22 These comments put a human face on the lines of code in learning diaries and serve as a reminder that agency can be a challenge as well as an advantage as students work without the stricter timelines of a more tightly structured course. They also illustrate the freedom students enjoy in making

their course work fit into their lives.

Setting curriculum. The last indicator in instructional design and organization is setting curriculum. This category of indicators had the least number of coding references of the indicators in the instructional design and organization category with only nine instances of the 442 total coding references in this category. The instructor made six of the nine references. The course creator commented on the nature of the curriculum, explaining: "the essence of the process! It's all about giving you control and agency, plus a relatively authentic experience using the tools and learning methods that programmers use and being here to help if you need it". C1-I1 The instructor elaborated on the course methodology regarding marking and student freedom to work along until the student comes to a stop point. He also speculated on the possibility of delivering the affordances offered on this course site in a Moodle environment. These posts give students insight into how the curriculum is set and how students should work within the structure.

Of the three student posts, two contained comments on how the structure of the course had supported their learning. The third post made a suggestion for material (code school) to be added to the course since there is no textbook. "However, it would be fantastic if this course included a subscription to code school, especially since no textbook is included in this course and most of our learning is done on other websites anyway." C1- S33 While this comment perhaps reflects a misunderstanding of the learning process designed for the course, it is an indication of a having a sense of agency strong enough to permit suggesting changes to the course structure.

Student posts centered on the effect the curriculum had on their learning. They spoke of preliminary units preparing them to continue and of appreciating having to learn the design process before moving on to more dynamic activities. This post illustrates awareness of the effect design had on the student's learning: "It was a good learning experience to be forced to follow the full design process in this unit". C1-S5 The fact that students commented on the curriculum and its effect on their learning is an indication of the students' awareness of the interplay between the curriculum and their learning.

Facilitating discourse. Facilitating discourse supports this replication and facilitation of knowledge. There were 151 coding references for this category, which includes encouraging, acknowledging and reinforcing student contributions, setting a climate for learning, seeking

consensus and understanding, drawing in participants, and identifying agreement/disagreement. The course instructor encourages, acknowledges and reinforces student contributions as well as setting a climate for learning through the course design and comments. He also draws in participants and prompts discussion. Due to the nature of the course, he does not exhibit seeking to reach consensus or understanding, nor does he identify areas of agreement or disagreement. All of these indicators are exhibited in student posts to varying degrees, however.

Encouraging, acknowledging, and reinforcing student contributions. The course instructor made 11 of the 42 posts coded as referring to this indicator. One of his comments to a new student illustrates this. "As creator of the course, it sounds like there's a lot I'll be able to learn from you." C1-I1 His comment illustrates the flat architecture where an instructor can learn from a student as appropriately as a student can learn from an instructor. In acknowledging student contribution, the instructor continues to emphasize constructivist learning.

The instructor also made four comments reinforcing student learning. The reinforcement both acknowledges the student's post and approves of her ideas or comments indicating to the student that this particular thought or approach is important.

Three of the instructor comments encouraged students. In one comment, he expresses his encouragement in terms of the agreeing with the student's assessment of the scope of the proposal and goes on to enthuse about the enjoyment that would be derived from developing it. This response encourages pushing boundaries to support her learning.

Table 5

Facilitating discourse indicators – coding references – Case A

Facilitating Discourse coding references	Instructor coding references	Student coding references
151 coding references	36/151	115/151
Encouraging, acknowledging or reinforcing student contributions	11/43	32/43
Setting a climate for learning	11/42	31/42
Seeking to reach consensus, understanding	0/25	25/25
Drawing in participants /prompting discussion	6/24	18/24
Identifying areas of agreement /disagreement	8/17	9/17

The instructor's posts were fairly evenly distributed between the three actions constituting this indicator (3 encouraging comments, 4 acknowledging comments, and 4 reinforcing comments). This was not the case for student posts.

Student posts were overwhelmingly acknowledgement of other students' and the instructor's contributions. Of the 31 student posts that were coded for this indicator, 30 of the posts were acknowledgements of other participants' contributions. Comments such as "I enjoyed reviewing other peoples (sic) information so I could prepare myself for what was required for the unit," C1-S11 and more directly, "I looked at other people's unit one submissions to get an idea of how to craft my personas and their scenarios." C1-S48 One comment reinforced the idea of benefitting from others' experiences in this post:

> I found it difficult to gather and list all of the requirements needed for this unit, but while reading other Learning Diaries, I came across one by C1-S18 She has a great table listing all unit requirements and in general presents her data in a way that's easy to follow. C1-S33

One post reflected encouragement in which a student praised another's website and expressed

the belief that the site would be of great help to other people.

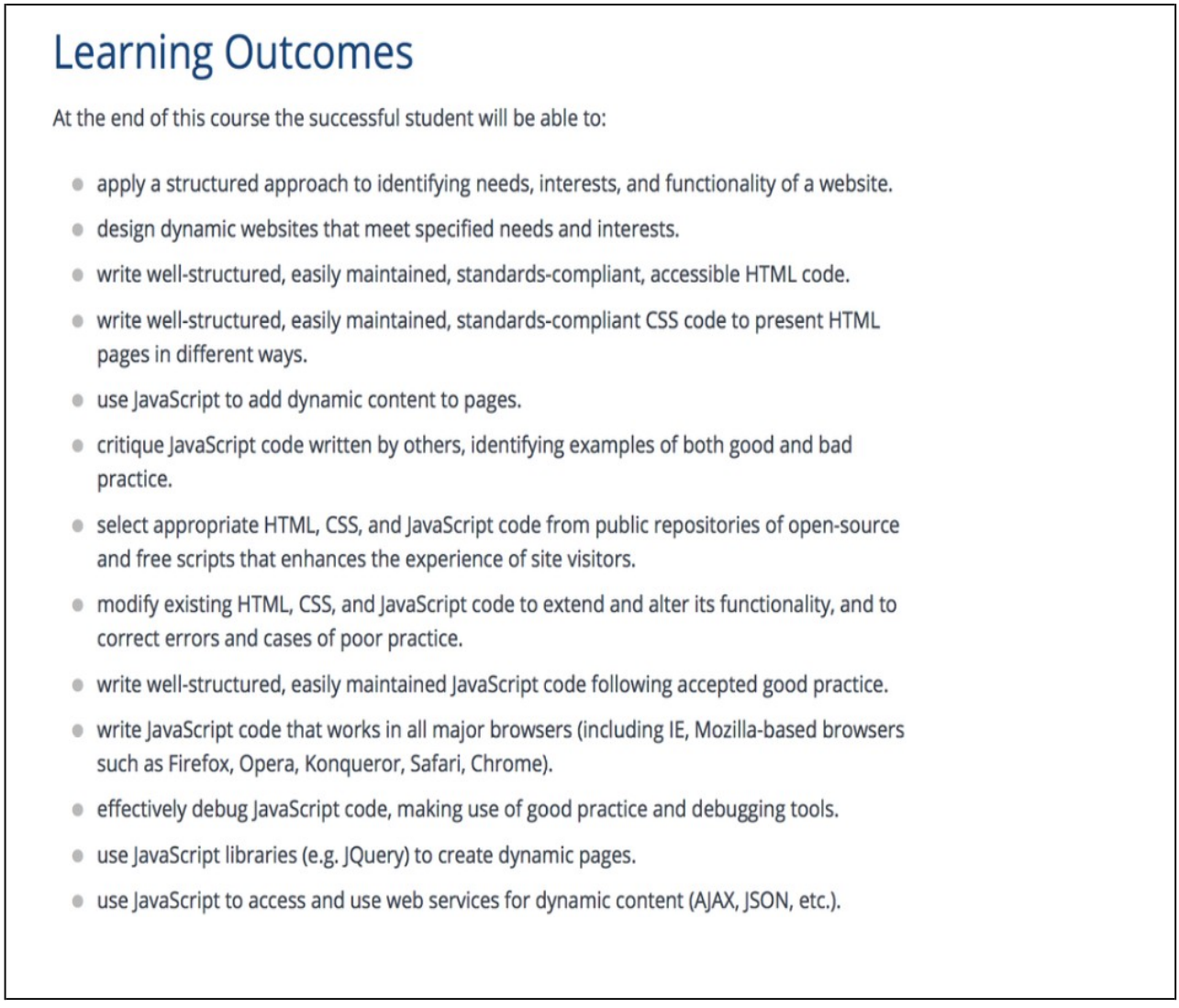
Setting a climate for learning. Like establishing and maintaining netiquette, setting a climate for learning is a joint instructor/student effort for several reasons. The instructor can set a climate, but unless it is maintained by student use, it dies and disappears, and learning becomes a sterile exercise. This distribution of responsibility for creating the climate is in accordance with one of the basic premises of the Landing design. Setting a climate for learning accounted for the same number of coding references as encouraging, acknowledging, and reinforcing student contributions.

The instructor's posts generated 11 or 26% of the coding references while student posts resulted in 31 or 74% of the references. The instructor is responsible for putting structure into the course to allow students to take advantage of the structure to scaffold their learning. The word instructor is a derivative of the term structure (dictionary.com). Many of the instructor's actions that set a climate for learning are encapsulated in the course design – its structure. In creating learning situations and activities that reflect the instructor's beliefs about teaching and learning, the instructor establishes behavior parameters and learning expectations that create the atmosphere in which the students will learn. Looking beyond the activities that students are expected to complete, the verbs used to describe what the student will be able to do to successfully complete the course reveal what thinking processes the students are expected to use and can be viewed as a progression as described in Bloom's taxonomy (Bloom et al. 1956; Anderson et al., 2000). (www.nwlink.com/~donclark/hard/bloom.html)

The first verb: "apply" requires the use of knowledge that is already part of the student's constructed knowledge. This verb along with the verb "write" – referring to code in two other outcomes – and the verb "use" also require knowledge the student has already constructed. "Selecting" (appropriate code) requires the student to analyze and evaluate the material on the websites before choosing what she will use. The act of critiquing involves analysis and evaluation which requires relatively extensive knowledge of the subject area being examined. Debugging code is an action that can reflect all of the taxonomic levels. The course creator describes debugging: "So, basically, it can be very simple but, more often than not, it is a far more complex process involving deep analytic abilities, creativity, logic, inspiration and ingenuity." (Jon Dron, personal communication, July 13, 2017).

In summary, the verbs used to describe learning outcomes set a climate in which students

have to use a range of thinking skills to meet course objectives. By detailing the use of a range of thinking skills and linking them to the elements of the problem – the design and creation of a website - the course creator guides the students to use these skills and indicates the depth to which they should address the outcomes. This action gives students the information they need to succeed in completing the course.



Learning Outcomes

At the end of this course the successful student will be able to:

- apply a structured approach to identifying needs, interests, and functionality of a website.
- design dynamic websites that meet specified needs and interests.
- write well-structured, easily maintained, standards-compliant, accessible HTML code.
- write well-structured, easily maintained, standards-compliant CSS code to present HTML pages in different ways.
- use JavaScript to add dynamic content to pages.
- critique JavaScript code written by others, identifying examples of both good and bad practice.
- select appropriate HTML, CSS, and JavaScript code from public repositories of open-source and free scripts that enhances the experience of site visitors.
- modify existing HTML, CSS, and JavaScript code to extend and alter its functionality, and to correct errors and cases of poor practice.
- write well-structured, easily maintained JavaScript code following accepted good practice.
- write JavaScript code that works in all major browsers (including IE, Mozilla-based browsers such as Firefox, Opera, Konqueror, Safari, Chrome).
- effectively debug JavaScript code, making use of good practice and debugging tools.
- use JavaScript libraries (e.g. JQuery) to create dynamic pages.
- use JavaScript to access and use web services for dynamic content (AJAX, JSON, etc.).

Figure 4. Learning outcomes in Case A.

A second factor in setting a climate for learning is motivating the student. The course design gives students agency to choose the topic for their website and this design decision takes advantage of the natural human tendency toward self-interest. The desire for people to be seen and heard – through their website – particularly for students who have matured with the social

technologies employed in the course design - acts as a motivator to acquire the skills and thought processes necessary to present their ideas to the virtual world.

Personalization continues with the student being able to control the activities and strategies she uses for learning. She has agency to own her learning rather than receiving knowledge from an instructor. This student comment is typical of many student posts in its focus on student agency: “It was very fun to make my own format and I look forward to the next topic where I'll be doing more scripting!” C1-S4

A third element of creating and maintaining a climate for learning is allowing students to share their excitement about and satisfaction in their work. The non-traditional approach to learning and the instructor’s strategy of welcoming students on a personal level work synergistically to create an atmosphere where students feel that they can focus on their work and the challenges it provides. Students, following the instructor’s example, feel free to disclose their doubts and subsequent successes as this student did:

> I found this pretty helpful because I was a little bit daunted by the unit. Listening to the audio clip somehow got me more excited to start the unit. I think a task like this can be a little bit intimidating at first, so it was a good warm up.” C1-S19

The desire to produce work that is unique drives some students to push their work to higher levels as shown by this post: “My tutor responded that these were the most commonly used ideas which pushed me to evolve my idea a little more so that it would be a tad more unique.” C1-S8

The same student expressed the satisfaction that comes from a job well done. “This unit is by far the unit that required the most time for this course thus far but also one of the most validating”. C1-S8 Comments like this as well as expressing a student’s satisfaction can also serve as motivation for those who are struggling: “I have worked long and hard on it (particularly the form validation) and have utilized the Landing to help solve some problems I had”. C1-S10

Stigmergic signals such as the instructor’s tacit recognition of student ownership of their work: “I will try to find time to add more if people give me permission,” C1-I1 and admissions of fallibility: “When I am using one, I often mistakenly attempt to use the wrong syntax,” C1-I1 prompt students to participate in the creation of knowledge. “I found a piece of usable code at the same site that turned out to be much more complicated. In the pursuit

of knowledge, I will attempt to discover why in the following document". C1-S9 These signals model and prompt the evidence required in the course evaluation (http://www.athabascau.ca/syllabi/comp/comp266.php). These student comments illustrate how the course structure influence students' sense of what they need to do to complete the course, give them a sense of the boundaries in the course by establishing the instructor as an important friend, establish student agency, and motivate students using their own self-interest, their sense of accomplishment and their desire to succeed.

Seeking to reach consensus, understanding. Seeking to reach consensus and particularly understanding is a useful strategy for knowledge building. Students made all of the posts coded as this indicator. They formed 16.55% of the total coding references for facilitating discourse.

Due to the nature of the course, students were trying to reach understanding more than consensus. Consensus in this environment refers more to an attitude toward learning than a common point of view toward a given topic. There is evidence, however, of consensus in terms of which websites are most useful and which strategies are most effective. A student posted: "I was still a little bit foggy on it all, so I took to the landing to read the submissions of others on this unit. I often find the landing to be a helpful resource in this way." C1-S19

Students used work – their own and that of other students - to increase understanding. "Making the personas and scenarios gave me a much deeper looking [sic] into what I was actually designing". C1-S14 In verbalizing their path to understanding, they too left stigmergic traces for other students following them. "It also led me to more reading about headers and footers as accessibility aids". C1-S28 The posts also revealed their understanding of learning strategies in the course. "As I understand it, . . . someone else made the blocks, but we need to put them together in a usable manner." C1-S33 Each of these elements adds to the growing collective knowledge residing in the course site and indicates connectivist characteristics.

Drawing in participants, prompting discussion. Although this course is not based on discussion, the instructor and students did encourage discussion. The instructors made one third of the 24 references coded to this indicator. They encouraged students to make contributions to improve the course, increase the instructor's knowledge when a student showed an area of expertise and asked for constructive criticism.

As mentioned above, the instructor's posts included invitations to participate in

discussion. The instructor is quite direct – requesting "suggestions and critiques" C1-I1 – twice during the three months of the investigation. Instructor actions such as disclosure and design elements such as having students post learning diaries in which they reflect on their learning process also prompt discussion. These posts reflect almost the same percentage of coding references as seeking to reach consensus and understanding. Twenty-four of the 151 posts in this category reflect drawing in participants, prompting discussion.

Students' efforts to reach understanding and consensus rest on participation and so they draw in participants while prompting discussion. Students used the site to ask for help, at times quite bluntly. "Feel free to post any questions you might have about this!" C1-S10 is a reply and invitation from a student to ask about a technical problem. This openness encourages other students to come forward with their dilemmas and questions and contributes to connecting the members to each other. Use of this teaching strategy, while not natural for everyone, allows those who choose to use it, the opportunity to connect with others and to increase social capital within the group. As the action of drawing participants into discussion becomes more naturally incorporated into student approaches to the course, interaction between participants should become a greater part of the interactions.

Identifying areas of agreement/disagreement. The instructors identify areas of agreement with student comments when possible and gently disagree and correct when students misspeak. Just over one third of the 17 coding references were instructor contributions.

Given the course design in which each student develops her own project, there is limited opportunity for extended common discussion as there would be in courses with a different learning focus. Due to this, identifying areas of agreement and disagreement has limited presence in this course. Only 17 of the 151 coding references for facilitating discourse reflected identifying agreement/disagreement representing just over ten per cent of the references.

The comments illustrating this indicator were superficial in nature and ranged from an abrupt "the answer is no," C1-S48 in regard to the use of code to a more extended response to a request for information about corporate activity "I'm not sure about how much of the internals of (names a major corporation) I can share here". C1-S20 Student focus on individual projects inhibits indicators of agreement and disagreement. In a course with a focus on the development of a common understanding of a set of concepts, this indicator may have a different status.

Taxonomy of discussion indicators. The taxonomy of discussion indicators developed by Booth and Hultén (2003) explicates the degree to which discussion moves student activity toward learning. Booth and Hultén (2003) posit that students' participation in learning activities can be categorized in four ways: participatory indicators, factual indicators, reflective contributions and learning contributions. Students often remain at the factual indicator level (Booth & Hultén, 2003), having made postings that indicate their participation in the discussion activities of the group and are working at making proposals, presentations, asking for facts related to the problem and suggesting eventual solutions. Booth and Hultén's contention is that students who in their discussions move on to reflective contributions – questioning what is said and substantiating agreement and disagreement with statements, then move on to indications of being open to new knowledge possibilities – learning. Those who remain at the factual level can be prompted to move to reflective contributions by teacher support.

The purpose of using this framework within these course postings is to show the degree to which teaching actions helped move students toward reflective contributions. In Case A, the first two indicators were evident in the order in which Booth and Hultén presented them – participatory indicators, factual indicators. Reference codes for learning contributions were slightly greater than the reference codes for reflective contributions - 13 coded references for learning contributions and 12 coding references for reflective contributions. The categories will be discussed in the order reflecting the frequency of their coding references.

Participatory indicators. Participatory indicators: referring to what a person has said, identifying oneself, naming a person, requesting and asking in a general sense and acknowledging an earlier statement by name are all indicators that support and encourage student actions on the site. There were 161 coding references in total. They are associated with netiquette by humanizing posts and supporting the give and take of knowledge acquisition. References to a person or what a person has said are often delivered in a conversational style and range from general comments: "Thanks for the posts, gentlemen." C1-S10 to posts that name specific people and content: "X's post, which provides a nice collection of information that every COMP266 student should read at least once." C1-S16

Referring to a person or what a person said. Just under 30% of the indicators signaling participation referenced the indicator: a person or what a person said. This shows that

there was interaction between participants on at least a basic level. A number of the posts were made by the instructor and illustrated this practice of commenting on what students said in their introductory posts. One of the instructor's posts was a lengthy reply advising a student who was having technical difficulties with her work. Several others were affirmations of student statements and one disclosed the instructor's lack of familiarity with a text-editing program.

Table 6

Participatory indicator - coding references – instructor to student

Participatory Indicators	Instructor coding references	Student coding references
Coding references	32/161	129/161
Referring to what a person said	9/47	38/47
Identifying oneself	14/43	29/43
Naming a person	9/35	26/35
Asking (in a general sense)	0/15	15/15
Requesting (in a general sense)	0/15	15/15
Acknowledging an earlier statement	0/6	6/6

Student posts covered a variety of references. Several of the posts referred to correspondence with the instructor or the tutor. Almost half of the posts referred to another student or another student's post. Just over one third of the posts mentioned people from the student's non-academic life as exemplified by this quote: "After a few days of frustration I asked a friend to take a look at it for me". C1-S22 Referring to a person or what a person said along with identifying oneself and naming a person made up over three quarters of the posts in this category. This post is typical of references coded to this indicator: "Thanks C1-I1, i've (sic) adjusted and now homepage is working a bit better". C1-S17.

Identifying oneself. Just over one quarter (26.70%) of the posts in this category illustrated the indicator code referencing identifying oneself. Many of the references do only that, name the person posting. Students beginning the course during the study time frame provided more details about their identity, often including their physical location, status as a student, and reason for taking this particular course. "Hello, I'm C1-S23. I'm studying at (names another university)." C1-S23 Students generally spoke about their previous experience with computers and mentioned their aspirations for the future based on their course work.

Identifying oneself gives student posts transparency and grounds students in a learning environment that can sometimes be confusing. It also supports maintaining netiquette and a sense of camaraderie. This can lessen the sense of disorientation for students working in this environment for the first time.

Naming a person. There were 35 coding references illustrating naming a person. This reflects 21.73% of the coding indicators in this category. The instructors made 25% of the posts for coded with this reference and students made 75% of the posts coded for this indicator. Most of the posts coded for this indicator named people in salutation or to end a post. In one post, students' names were listed to identify which student posts the writer had used as a reference and guide for completing a unit. Several of the posts used the text symbol @ to address the post to a specific person, incorporating a convention from popular social media platforms. "@ C1-I1"

Asking and requesting in a general sense, acknowledging an earlier statement by names Asking in a general sense, requesting in a general sense, and acknowledging an earlier statement by name made up just 22.34% of the posts in this category. When students or the instructors asked questions in this course, they were specific rather than general, so the general requests and questions were addressed to the community at large rather than to one specific person. Due to the lack of traditional discussion on the site, the posts acknowledging an earlier statement were comments on the student's own previous posts.

The indicators requesting and asking in a general sense, maintained netiquette on the site, extended invitations to try parts of peoples' sites, and posed questions about procedures. Students did not ask general questions about personal topics such as geographic locations or particular interests. The requests were put out using terms such as "if someone, anyone could" C1-S38 and "I welcome you guys to try it" C1-S4 Posts acknowledging earlier general statements addressed student reaction to the earlier statement but did not contain any qualitative

judgment about the value of the statement or how it related to the commentators' learning.

Overall, participatory indicators supported maintaining netiquette by keeping humanity on the site. These posts did not contain great contributions to learning on the site but did support the activities necessary for learning. Where in Booth and Hultén's study, participatory indicators were prominent at the beginning of a series of posts, the nature of continuous enrollment in the course negates this characteristic. On this course site, participatory indicators were distributed throughout the posts as students entered the course site for the first time.

Factual indicators. The factual indicators of presentation, proposals, eventual solutions, and requests for facts related to the problem (in this order) were the most evident on the site (17 in total). This echoes the prevalence of the teaching presence category: direct instruction.

Table 7

Factual indicators - coding references – Case A

Factual Indicators	Instructor coding references	Student coding references
Coding references	18/172	154/172
Presentations	2/67	65/67
Proposals	2/42	40/42
Eventual solutions	10/32	22/32
Requests for facts related to the problem	4/31	27/31

Presentations. Using Booth and Hultén's (2003) framework, just under 40% of the coded references for this category indicated presentation. Given that students demonstrate their learning by presenting their work in their learning diaries, this is an expected outcome. Having to write out the steps taken to reach a certain point in the development of their website not only forces the student to reflect on what she has done; it also provides an opportunity to diagnose misconceptions and to solidify her understanding of what she has learned. Students make presentations, posting the evidence of their learning on the site as proof of having completed the actions necessary to accomplish their goals. "At first glance of the "poorly written HTML page", I noticed that there were tags included for a title but no title." C1-S19 These posts also provide guidance for subsequent students planning their work.

Proposals. Students are also required to publish their ideas for their work in the form of proposals and these made up 24% of the coding references in this category. Students often explained their intentions at some length and this process of working through their intentions again provides the opportunity to reflect on the process they will undertake and possibly anticipate problem areas in their work. One student expressed this in the following:

> This idea presents an unknown level of complexity. It would be interesting to pull of (sic) but might not work because we cannot do server-side processing. However, I am unsure of what that even entails. I am imagining this working much like how we upload content to the website using cyber duck. C1-S25

This comment illustrates the bricolage aspect of the course. The course creator credits Seymour Papert with having had "a fair bit of influence in the way this course is built." C1-I1 Students, because they are not tied to a particular design approach for their websites, are free to propose, explore, and discover solutions.

Some students seek to influence the tutor's approval. "This is the idea which I REALLY want to do," C1-S4 and then go on to propose other ideas that they think will be more acceptable. These proposals are not the type of proposal that lead to the discussion of alternative methods of approaching or solving a problem that an entire group is working on. They are individual and so are of a different nature than the proposals identified by Booth and Hultén (2003). Not subject to the give and take of discussion which occurs to solve an immediate problem, they resemble seeds that lie dormant until the conditions are right for their growth in

another person's understanding.

Eventual solutions. In contrast, eventual solutions are suggestions or ideas that could lead to solving a problem. Like proposals, they are not the same type of eventual solution offered in groups discussing an approach to one problem. Nineteen percent of the coding references indicated eventual solutions. The instructors made one third of these comments. They ranged from suggestions of programs that could work in certain circumstances to strategies for fixing specific problems.

Student posts ranged from suggestions to solve other students' problems to a reporting of the solutions they used to solve their own problems. Along with the solutions, instructors and students recorded the websites they used so that these sites become part of their portfolio for evaluation and secondarily so that other students can benefit from their research and experimentation.

The solutions are presented and may or may not be discussed or acted upon. The instructor commented on curriculum design and offered this eventual solution: "we could make it simpler and more supportive, so I'd like to tweak it" C1-I1 Other posts offer solutions that may or may not be used by those to whom they are offered. "Try utilizing the above developer's console for Units 5, 6, and 7. It saved me". C1-S10 These posts add to the collective nature of knowledge on the site and underscore the connective characteristics evident there.

Requests for facts related to the problem. Requests for facts related to the problem is an indicator that reflects student requests ranging from asking for help to needing clarification on how to proceed with posting or sending messages. Eighteen percent of the factual indicator posts showed evidence of asking for facts related to the problem. With the design of the course, there is no central problem. Each student develops her own website with a unique combination of design elements and so the problems for which students need facts are unique. Four of these coding references were from instructors and asked for further information regarding problems students had as well as requests to share links and information about software.

The remaining coding references (27) were requests for information about how to proceed with course protocols and timelines, how to contact the tutor, and specific questions about how to solve problems with website performance. Students used the site much as students in face-to-face institutions use study groups.

The act of requesting facts related to the problem is another instance of students using

higher order thinking skills to analyze their problem and then articulate it in a manner that is succinct and clear to colleagues who are familiar with the tools being used but not familiar with the specifics of the website. Although one student simply posted "Help?" C1-S47, most of the students reflected on their actions and were able to describe them often with speculations as to the reason for the problem: "while working on CSS I am starting to see many flows (sic) in my HTML code, is it OK to change the HTML files with commets (sic) and reasoning?" C1-S39

Reflective contributions. Reflective contributions (1.44% of the coding indicators for this framework) fall into two categories: substantiating agreement or disagreement with statements, and questioning what is said.

Table 8

Reflective contributions indicators – coding references – Case A

Reflective Contributions	Instructor coding references	Student coding references
Coding references	0/5	5/5
Substantiating Agreement/Disagreement	0/3	3/3
Questioning What Is Said	0/2	2/2

Substantiating agreement, disagreement. Sixty percent of the coding references reflected substantiating agreement or disagreement with statements. In response to a suggestion from the instructor, a student stated:

> I don't think I'll be using Lynda.com for this course as I think the open-ended approach to learning that this course embraces allows for me to truly develop competencies in the areas taught instead of just knowing how to do specific tasks. C1-S45

While there are not large numbers of substantiating agreement or disagreement with statements, the eight that exist illustrate students' agency to choose their learning strategies and approaches to developing their expertise.

Questioning what is said. The remaining references (0.86% of the total coding references

for this category) reflected questioning what is said. The references here were not references to statements that were made by another person but were questions regarding what is found in terms of codes on internet sites. One student commented on getting a 404 page not found error when she tried to open the university website. She questioned whether the instructor was aware of the problem. Other posts questioned the working of search engines and code that the students thought should work. These few posts reveal the confidence that students have in the reliability of the information they find supporting the course.

Learning contributions. Just under half of the posts indicating that learners were open to new possibilities that were not previously part of constructed knowledge focused on the design technique of creating personas as a means of discovering their website needs. Several students valued this technique as shown in this post:

> At first, I thought that the process of scenarios and personas was tedious and had little benefit, but after working through the process I realized that it is a powerful design tool that can be extended to much more than just websites. C1-S34

Table 9

Learning Contributions Indicators – Coding References – Case A

Learning Contributions	Instructor coding references	Student coding references
Coding references	0/8	8/8
Statements that show learners open to new possibilities	0/8	8/8

Other posts addressed new attitudes toward mobile compatibility and the development of time management skills. These students are exercising metacognitive skills in recognizing their change in perspective.

Although not all students expressed reflective contributions and subsequent learning contributions, there is evidence that some students were aware of their change in perspective.

Value creation cycle indicators. This change in perspective is reflected in the value creation stories two of the participants in Case A told using the value creation story template created by Wenger et

al. (2011). Prior to discussing the value creation stories, we will examine the information derived from the value creation cycle indicators.

Value creation cycle indicators are based on the Kirkpatrick model (Wenger et al. 2011, p. 19) and are intended "To assess and promote value creation through social learning" (Wenger et al., 2011, p. 16). The authors describe an identifiable cycle of value creation in communities and networks and the value derived from the tension between everyday activities and participants' aspirations. Cycle one indicators describe activities and interaction and represent the immediate value found in acts such as helping with a difficult case, a productive online meeting for community members, getting an address, or asking a question of the network. Cycle two indicators, identifying potential value, detail various forms of knowledge capital: personal assets or human capital, relationships and connections or social capital, resources which are tangible capital, collective intangible assets or reputational capital (which is beyond the scope of this investigation), and a transformed ability to learn which is termed learning capital. Cycle three indicators reveal changes in practice – an applied value based on the adaptation and application of knowledge to a particular situation. Cycle four identifies realized value in terms of performance improvement and Cycle five reflects a redefinition of success.

Wenger et al. (2011) caution that the cycles do not always appear in a sequential fashion as they reflect the iterative nature of learning. It is also not necessary for communities and networks to complete all the cycles. The framework is intended to provide a measure of community and network activity rather than a program that needs to be completed. As for previous frameworks, indicators will be discussed beginning with the indicator that received the largest number of coding references – knowledge capital.

Knowledge capital. Students' use of blogs, learning diaries, and reflections exemplify knowledge capital – cycle two indicators. Students reported their acquisition of skills in their learning diaries and commented on their changes of perspective this development provoked.

Knowledge capital indicators represent 62.99% of the total coding references for the framework for assessing value creation indicators. Of the indicators in this category, tangible capital indicators represented the greatest number of coding references - 59.8% of the total.

Table 10

Knowledge capital indicators – coding references – Case A

Knowledge Capital Coding References	Instructor coding references	Student coding references
Coding references	34/714	680/714
Tangible capital	21/427	406/427
Human capital	0/227	227/227
Social capital	13/50	37/50
Learning capital	0/10	10/10

Tangible capital. Tangible capital represents the access participants enjoy due to their participation in community or network activities. In real terms, they have access to pieces of information, procedures and tools through community activity and tag clouds, links, references, and search capabilities through network connections. Of the 427 coding references indicating tangible capital, 21 references were from the instructor with the remaining 406 from students.

The instructor posted URLs for websites, suggested browsers, alternate hardware to address eyestrain issues, solutions for code that does not work, reinforcement of understandings of how the Landing works, as well as comments on student suggested codes. As well as contributing information to the participants, the instructor's posts provide an example of how to post and discuss informational resources.

This access to information – both factual and procedural - allows students to gather the information and strategies they need to develop their projects. In addition to posts containing websites, they post records of procedures and strategies they used at times containing short evaluations of their success. The actions students undertake as a result of tangible capital are discussed below.

The posts varied from simple lists of sites a student accessed to lengthy detailed description of sites and how they helped the student develop their site or solve a problem. The majority of posts coded as tangible capital also reflect the production of tools and documents that inform students' learning practice. The quality of the posts is monitored in student comments relating the usefulness of a given site. While the posts generally reported information found or received such as this post where a student shared a site "Attached is the source code for the

game, you guys are all more then (sic) welcome to use my source code to help you out!". C1-S17 Students also reported using other students' work to support their own learning efforts. For example, another student posted: "I read the blogs of other students who had completed Unit ` and this was extremely helpful." C1-S28 This post illustrates how this student used learning diaries posted on the site as a resource to inspire their own learning. These posts form the basis for an information repository which students report consulting, and which will be discussed further in the Findings chapter. The posting and dissemination of the information about sites used also provided a means of developing human capital.

Human capital. There were 227 coding references for human capital, all of which came from students. These references include the development of a new skill, critical information, new perspectives and new ideas that address a class of problems. This comment:

> I made a mistake . . . in a while-loop, the code inside the code block runs over and over again until the expression inside the parentheses becomes FALSE, Not true. So, in the example above . . . the expression is "giveMe5 is not equal to 5." So, once giveMe5 IS equal to 5, the code block stops running. C1-S52

exemplifies these posts.

The Landing is a platform for discovering new skill as this student confirms: "Looking up some script and understandind (sic) it was really new, neat and intresting (sic). Finding a bunch of diffrent (sic) examples and learning how they worked and understanding the way that it funtions (sic) was very helpful." C1-S12 This student illustrates how the design elements of giving agency allow students to discover the learning tools that best support the individual's inquiry. New perspectives ranged from learning the importance of labeling code properly to a statement revealing newfound awareness of the struggle that can be involved in learning: "Something that seems so simple in my head ending up being kind of complicated," C1-S19 and to new perspectives: "I have created a couple of simple websites before and I was definitely not expecting all this planning at the beginning . . . if you imagine . . . building a website for someone else, it would be absolutely crucial".C1-S28 These coding references show the development of new skills, ideas, and perspectives.

Social capital. Social capital received far fewer coding references than the previous indicators of knowledge capital. There were 50 coding references for social capital which refer to relationships and connections. The instructor posted 13 coding references (26%) and students

posted 37 or 74% of the coding references. This indicator includes knowing of whom to ask questions as well as who to trust, and is considered an indicator of knowledge because it illustrates knowledge of the community, its common language and practices and its social customs.

Instructor posts establish their credibility as trustworthy sources of information. These posts welcome students; provide information and reassurances of progress. Student posts both acknowledged the help posts on the Landing gave them and used posts to reach out to other students for help with and support their learning.

> Has anyone else encountered this? I've been trying different things and googling questions for an hour now and have made little to no progress. I feel like this is the easy part and it is frustrating that I am already stuck. Thanks in advance for your help! C1-S19

The Landing allows students from anywhere in the world to connect with others on the Landing and this affordance minimizes participants' geographic dispersal with the attendant time differences increasing opportunities for connecting with others in the course. Two students offered detailed help within nine hours of the above post allowing the student to continue with her work. The fact that students have the confidence to post a general request for help from other students indicates the degree of social capital present in this course on the Landing.

Learning capital. Learning capital refers to a "transformed ability to learn" (Wenger et al., 2011, p. 20) more precisely, learning supported by a network or community. As the course creator stated in a post "the essence of the process! It's all about giving you control and agency, plus, a relatively authentic experience". C1-I1 Students do not explicitly express that their learning in a network or community is different from previous learning experiences. This may be due to their age – which was not a part of this study – and their previous experiences with participating in communities and networks in social media prior to taking the course.

Activity and interaction. Activity and interaction has four indicators: giving input, passing on information, helping a member with a difficult case and providing a tip to a colleague. Giving input reflected the greatest number of coding references in this category. Earlier in this chapter, giving input was characterized as being subjective, and so involves offering opinions or advice.

Giving input. Giving input represents 51.68% of the coding references in this category. Instructors' posts -17 of the 184 posts with this coding reference - included comments on the utility of various hardware and software products and systems as well as comments on organizational aspects of the course. This post illustrates a tip offered by the instructor: "If, like me, you like some aspects of Google Chrome but cannot stand its hunger for resources and so rarely use it, you might like Vivaldi". C1-I1 The instructors also responded to comments students made in their initial posts. These comments soften and humanize the technical content of the majority of the posts.

Student posts – 167 of the 184 posts with this coding reference recorded students' approaches to course tasks, their reactions to their learning, and comments about course resources. The posts illustrate the common experience that students enjoy over the timeframe of the course. When students share their experiences, they are able to see that their actions and reactions are not unique. This post details the student's approach to a unit but could also serve as a caution for other students: "I got a bit excited and jumped headfirst into this unit. I would likely take more of a basics approach to learning JavaScript if I could do this again." C1-S1

Passing on information. Shared experience encourages passing on information. This indicator represents 41.24% of the coding references in this category. Instructors wrote 33 coding references. This post exemplifies the informational nature of the posts: "Indeed, it runs while the condition is true. As you are already testing the condition in the loop, you could make that even more efficient like this". C1-I1

Students contributed 113 references. As the indicator name reflects, these posts pass on information about technical matters pertaining to their learning. This post illustrates how a student passed on information she had found in developing her site: "I found this article on accessibility to be quite enlightening: http://www.clarissapeterson.com/2012/11/html5accessibility/" C1-S28

Table 11

Activity and interaction – coding references – Case A

Activity and Interaction Coding References	Instructor Coding References	Student Coding References
Coding References	53/356	303/356
Giving Input	17/184	167/184
Passing on Information	33/146	113/146
Providing a Colleague a Tip	4/12	8/12
Helping a Member with a Difficult Case	7/12	5/12

Helping a member with a difficult case. Helping a member with a difficult case is the deliberate passing on of information to help a colleague. These posts represent 3.38% of the posts in this category with seven of the 12 posts coming from instructors and the remaining five posts from students. These posts are specific to a question, request for help, or an expression of frustration from another participant. The instructor posted: "A couple of possibilities: first, you might be using a media query (@media section) that overrides the standard behavior. Second (I'm guessing more likely) you might be using a bit of JavaScript or CSS". C1-I1 Students also posted to help others with specific problems. This post illustrates a student attempt to address a problem expressed by another student in a previous post: **"**Okay, I see what you're trying to do now! Much more complicated, beyond the scope of what I can really write in one comment. One idea I had is to create a 2D array". C1-S48

Providing a tip to a colleague. Providing a tip to a colleague had the same number of coding references as helping a member with a difficult case. This indicator also pertains to specific questions or requests for help. Instructors made four of the 12 posts while students made the remaining eight posts. These posts address questions that are less serious than the above posts and are phrased as suggestions rather than answers to specific problems. The instructor exemplifies the helpful tone of the suggestions in this post: "Hope this helps. If none of this

makes sense and/or none of it helps, tell us the doce (sic) you are using". C1-I1 Student posts were more general in nature: "I'd recommend Cacoo. It's completely free – you just have to sign up with an email address and a password." C1-S28

The majority of the posts in this category, 92.92%, added information to the exchanges being made in the course site. Giving input and passing on information set a tone wherein people have the information and encouragement needed to change their procedures.

Changes in practice. There were 60 posts coded that referred to changes in practice. Students made all but one of these posts. The instructor made one post which signaled the design characteristic of a shift in the hierarchy of the course, reminding students of their role in creating knowledge. Student posts detailed changes made in their work to improve their programming. Changes in procedure or trying a suggestion leveraged knowledge capital and indicated changes in practice in terms of applying the knowledge to the participant's particular situation. The following post illustrates a change made to organize the student's work more efficiently:

> "To make it easier for tutors to find different versions of my website, I decided to make a Comp XXX page with each unit comprised of separate files so that in the future I could keep several versions of my site up at the same time". C1-S33

Table 12

Changes in practice - coding references – Case A

Changes in Practice	Instructor coding references	Student coding references
Coding References	1/60	59/60
Changes in Practice	1/60	59/60

Value creation stories. Value creation stories allow participants' actions to be situated in the value creation cycle which considers value that extends beyond the personal learning value for the participant. This value includes both short term value and value realized over a longer period of time. Cycle 1 indicators are productive activities such as meetings or e-mails and produce concrete items. Cycle 2 indicators have potential value as expressed in human, social, tangible, and learning capital. Cycle 3 indicators represent promising practices in terms of how knowledge capital can prompt changes or innovation. Cycle 4 indicators are a realized

value and show a return on investment: how new ideas are applied to practice. Cycle 5 indicators represent a new definition of success – a reconsideration of learning imperatives. By placing value creation stories within the cycle matrix, the learning value of actions within the community and network can be decontextualized and supported or changed as appropriate.

Data for these indicators was collected by soliciting volunteers to tell their value stories by completing a value creation story template. A copy of this template is in Appendix C. Invitations to participate were sent to the instructors and students on the course site. Most of the course participants were no longer active on the site and due to ethical considerations, e-mails were sent to the students through the university's Information Architect. This was necessary to ensure course participants' privacy. One instructor and one student consented and completed the value creation stories.

The number of posts reflecting knowledge capital indicators suggests that much of the activity centers around knowledge acquisition. C1-S10, the student, described getting advice from another student that he was able to pass on to yet another student. He felt that as a result of getting this advice his mark improved and he was able to have a meaningful exchange with the other students. The course instructor, C1-I1, referred to this action in his value creation story as "an infection model of learning". The student reported that he experienced a sense of teamwork and the benefit he derived from the experience was the exchange of ideas. Regarding a new framework for success, he stated that the experience reinforced that working with others is an important component of achieving common goals.

As an instructor, C1-I1 saw students answering each other's questions, a Cycle 1 activity reflecting a productive activity. This activity spreads ideas and "slightly different ways of seeing coming from the students themselves." He sees "little themes coming up in the work . . . so I quite often find clusters of similar ideas infusing the . . . work". This series of actions produce the Cycle 2 value of "an infection model of learning". In a Cycle 3 value, participants share information and as C1-S10 reported, pass the information on to others – both promising practices. Students are inspired by the work of others, while their work in turn inspires other students and this represents a Cycle 4 indicator – a return on investment. C1-I1 sees his view of the reframing value – Cycle 5 - of participating in the course rests in the growth of his own understanding in terms of enhanced tacit knowledge. He characterizes tacit knowledge as changing continuously and resting in social interaction citing the action of greeting a new

student as soon as possible after the student's initial post as an action that sets a tone for student success. He relates that this is an action he carries over to his duties with staff as chair of a school in the university. "I try to follow the same ideas, so it's transferable knowledge." C1-I1 In a small way, this is a reframing of success, a Cycle 5 indicator.

C1-I1 mentioned another Cycle 1 indicator – recommendations. Recommendations on the Landing resemble 'likes' used in some social media. The action of recommending a post, tells other participants that the recommender finds value in the post. He suspects that recommendations from him as course coordinator carry more value than recommendations from students due to his position. Recommendations from students by proxy represent Cycle 3 actions, a promising practice. Again, by proxy, this represents Cycle 4 value – return on investment and Cycle 5 value as this is a practice representing a relatively new way of communicating with each other.

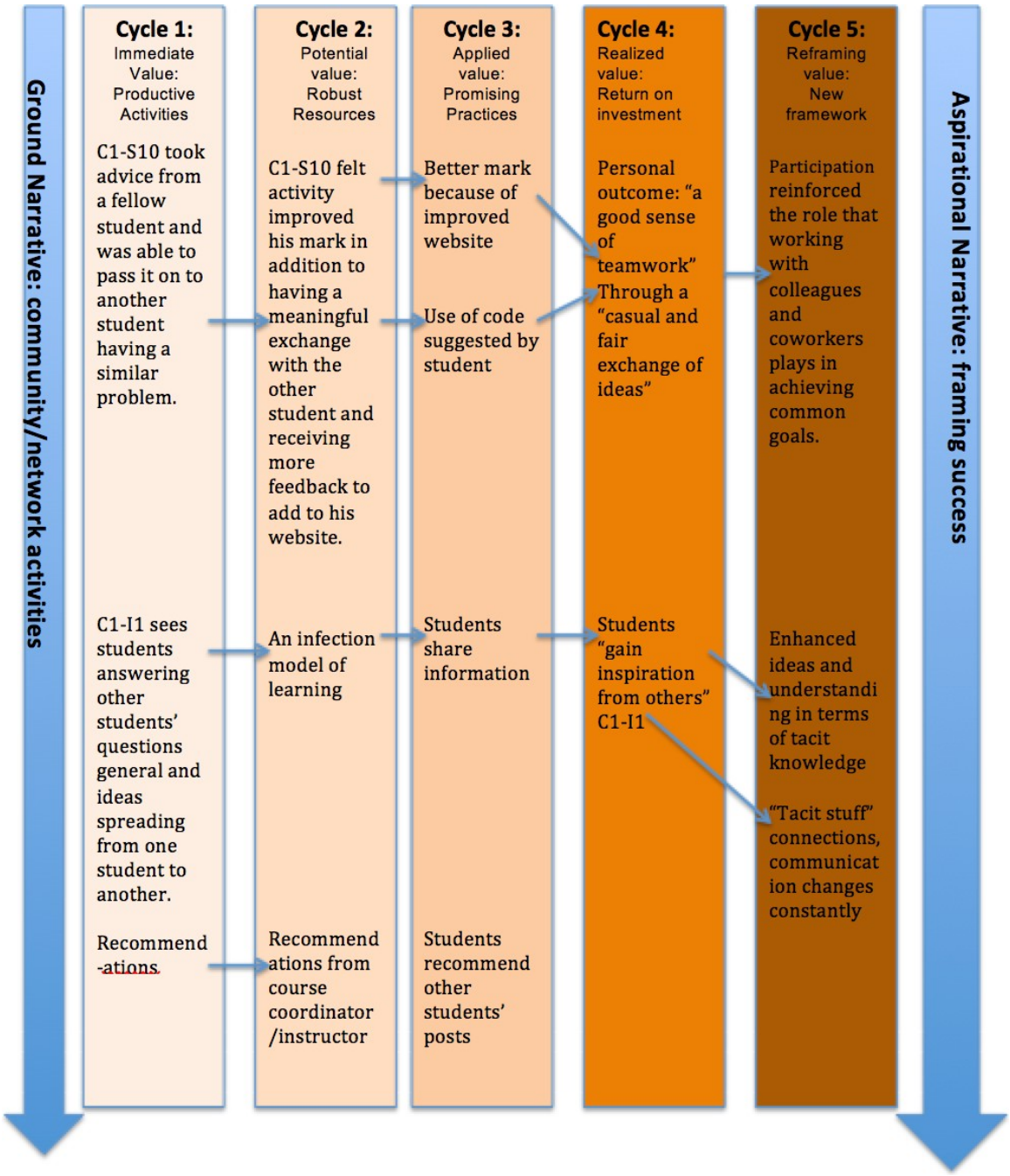


Figure 5. Case A: value creation stories and value creation cycles.

Groups, nets and sets. Groups, nets, and sets are social forms used to varying degrees in the course sites on the Landing. In order to identify these forms, Dron and Anderson's (2015, p. 142) rules of thumb provided coding guidelines. Groups are entities that continue to exist even without participants. Nets are characterized by participants' ability to identify

one and other and in sets the most important aspect is the topic with participant identification inconsequential. The presence of these entities in Case A on the Landing is discussed below.

Groups. The group in Case A is an educational group with many of the group characteristics exhibited in the 288 coding references for this category. Posts reflecting direct instruction indicators from the teaching presence framework, factual indicators from the taxonomy of discussion framework, and knowledge capital indicators from value creation framework are an educational group on the course site. There is a unity of purpose due to the nature of the site – a shared desire to learn programming. However, due to the self-paced nature of the design which includes continuous enrollment, the active membership in the group is fluid, mitigating the group effect. Students choose their own website topic and design, which weakens the effect of task in group cohesion. The diverse nature of the group topics facilitates the sharing of multiple approaches to programming web design. In posting to the group, a design feature outlined in the student learning outcomes, students' work is readily accessible to others in the group, allowing the students the advantage of having their work reviewed by many people. It also ensures that the instructor will be able to access the work easily. Students benefit from the safety the site provides for student to risk publishing their learning activities. Beyond the personal benefits of posting to the educational group, it adds to the readily available knowledge in the collective that is growing as each student adds to the repository.

The group offers a hierarchy with the instructor and tutor, due to their position and experience, holding a slightly higher position than the students despite the instructor designing the course for a flattened hierarchy where students are able to contribute and teach with the same authority as the instructor. The instructor demonstrates this through his words as well as his actions as shown in this post: "I've not come across Geany before – it looks interesting . . . Do share it via the group bookmarks if it turns out to be useful. If you recommend it, I will add it to the FAQ." C1-I1

Student comments expressed concern over accreditation, for example: "I reached a point I just needed to get some marks to pass the course," C1-S17 to raising questions about the tensions between learning, accreditation and reporting timelines. A student who had finished the course "around May" C1-S52, posted in mid-July wondered when she would receive her marks for the course. The desire for marks at the end of a course also represents the exit ritual of a report card

– a carryover from K-12 education where a mark signals the end of units of study and years of education. The possible reasons for this will be discussed in the final chapter.

Nets. Nets or networks consist of nodes and edges – the connections between nodes. There were few coding references for this indicator (four references). Despite the few references, there are indications of networks within the site. Participants are identifiable through their presence in the postings which allow them to share information cooperatively often through the use of tags, which Trant (2009) terms "an act of sense making" (p. 15). The network allows students and staff to find information that they may not otherwise have access to. This is of help while the student is working on course activities. There were no posts from previous students returning to the site after they have finished the course, during the time span of the investigation despite encouragement from the course creator to maintain their activity after they have finished their course work, although, determining participation by previous students returning to the site to read or retrieve information is beyond the scope of this study.

Sets. Participation in the set of people interested in programming languages leads to student participation in the educational group that is the course. There were 92 references for sets. The instructors made 15 of the posts with references for this indicator. Students made the other 77 references. Many of these references were tags and bookmarks. These give access to information for those interested in the topic without regard for the participant's identity.

Summary

In answer to the first research question of this study: To what degree is teaching presence evident on the Landing, in Case A, it is evident to a very high degree. The course is designed to allow a great deal of agency for students, both in their choice of learning materials and in their choice of project through which to demonstrate their learning. Course organization allows students to proceed through to two checkpoints leaving the course design and feedback opportunities to serve as formative assessment for students.

Due to the design and organization of the course, direct instruction (originating from student- not teacher) in the form of students reporting their learning activity is the teaching presence category with the most coding references. In using the site to present their thinking processes and results, they are able to confirm their understanding, trusting that in a course where summative evaluation is limited to an overview of their activity over the time span of the

course, they will receive support and correction from other participants on the site if they are on the wrong track or unable to resolve problems. The actions of responding to technical concerns and diagnosing misconceptions support student agency to make mistakes and struggle with difficulties in their learning while having confidence that they will be guided to the information needed to correct their work. These actions are stygmergic traces, that are left due to the course design and organization.

In like manner, students make use of the indicators described in the instructional design and organization category. They design methods on a micro-level when designing their sites and the codes that define them. In this way, design permeates all levels of participation in the course. The course creator uses design and course organization to create activities that allow the student a high level of agency and control. By listing learning outcomes and creating a series of activities that scaffold student participation in design activity, the creator gives students the agency needed to pursue learning in a form that interests them most. This design coupled with the indicator establishing netiquette prompts effective utilization of the medium. Students used the medium to ask for help and to offer it, to reveal discoveries of useful sites and tutorials, and to empathize with others' difficulties.

This was supported by the taxonomy of instruction indicators for which factual indicators presented the greatest number of coding references. In answer to the second research question and its sub-question, discussion does not promote learning at least as measured by Booth and Hultén's taxonomy of discussion indicators. Students came to learn through dialogue rather than through discussion. The postings in Case A did not follow the progression that Booth and Hultén (2003) described in their framework. The framework did reinforce the presence of direct instruction indicators with the number of coding references for factual indicators which include presentations, proposals, eventual solutions and requests for facts related to the problem.

The framework for assessing value in communities and networks also confirmed the presence of direct instruction indicators in the number of coding references for knowledge capital, in particular tangible capital which gives access to websites, online tutorials, and learning diaries. This is a value available only to members of the community or participants in a network.

Instructional design and organization supports the above indicators in the emphasis on a flattened architecture which gives students agency to share information and help fellow students

solve problems. Evidence of this social interaction is supported by the participatory indicators from Booth and Hultén's (2003) taxonomy of discussion indicators and the activity and interaction indicators in Wenger, Trayner, and de Laat's framework for assessment of value in communities and networks.

Case A is a course in which students are able to use the affordances of the Landing and those offered by the course instructional design and organization to share information with fellow students and to use the work of previous students to support their learning. Indicators from the frameworks used to investigate Case A show that direct instruction and the supporting indicators of factual indicators and knowledge capital are the most frequently coded references.

Chapter 5. Analysis of Findings

Case B

Case B investigates another computer course with an emphasis on robotics and embedded processors. The course is open to anyone who has an interest in robotics and there is no programming prerequisite. Students need to receive permission from the site owner (the instructor) to use the site and currently there are more than 107 members of the group. During the three months of course postings studied, there were 16 participants: 1 instructor and 15 students who made a total of 169 posts resulting in an average of 10.5 posts per participant. The nature of these posts will be discussed after a brief description of the course design.

The course content is delivered on the learning management system Moodle supplemented by a closed site on the Landing. This closed site has sub-pages for three units, with group tags for COMP XXXX, reflections, personal notebooks, robotics, unit 1, unit 2, arduino, compXXXX, project and unit 3. Students choose a project they wish to complete and begin building the knowledge necessary to select their materials to construct either a robot or an embedded processor which responds to specific physical stimuli.

The design of this course site prompted the need for a different research approach to collecting the posts made by participants. Posts from the group activity pages for the time frame of the course were found and a list of student names was compiled. Then posts were transcribed from the group member list and crosschecked with individual members' pages to be sure that all posts were included in the transcription. The transcriptions were then coded for the indicators for each framework and analyzed. The Instructor's Notebook – a series of posts – addresses the information students need to complete the course. In the Project Ideas page, the instructor cautions student to rely on a project they are interested in rather than feeling that the projects listed are prescriptive. In emphasizing student choice, he gives students agency to own their project and their learning. In the Collaboration Assignment page, the instructor details how students will provide proof of collaboration. He quotes the study guide on the Moodle course site which asks students to submit "a summary of your group work and collaboration efforts throughout the course". The Moodle site details how to upload copies of discussions in which the student has collaborated. Below this, the instructor elaborates, explaining that rather than copies of posts, he is looking for "a reflective document" summarizing how discussion, participation and collaboration has shaped the students'

course work. He summarizes by reminding students that their post needs to convince him that it is worth 15% of their mark and that he wants to give the best mark possible to each student.

The following is a summary of the findings for each Community of Inquiry teaching presence indicator beginning with the indicator with the most coding references. Proceeding through the teaching presence indicators, the discussion will move on to indicators describing taxonomy of discussion indicators followed by indicators describing value creation. The distribution of activity in groups, nets, and sets will be discussed next. This section will conclude with a general discussion of the indicators evident in this course.

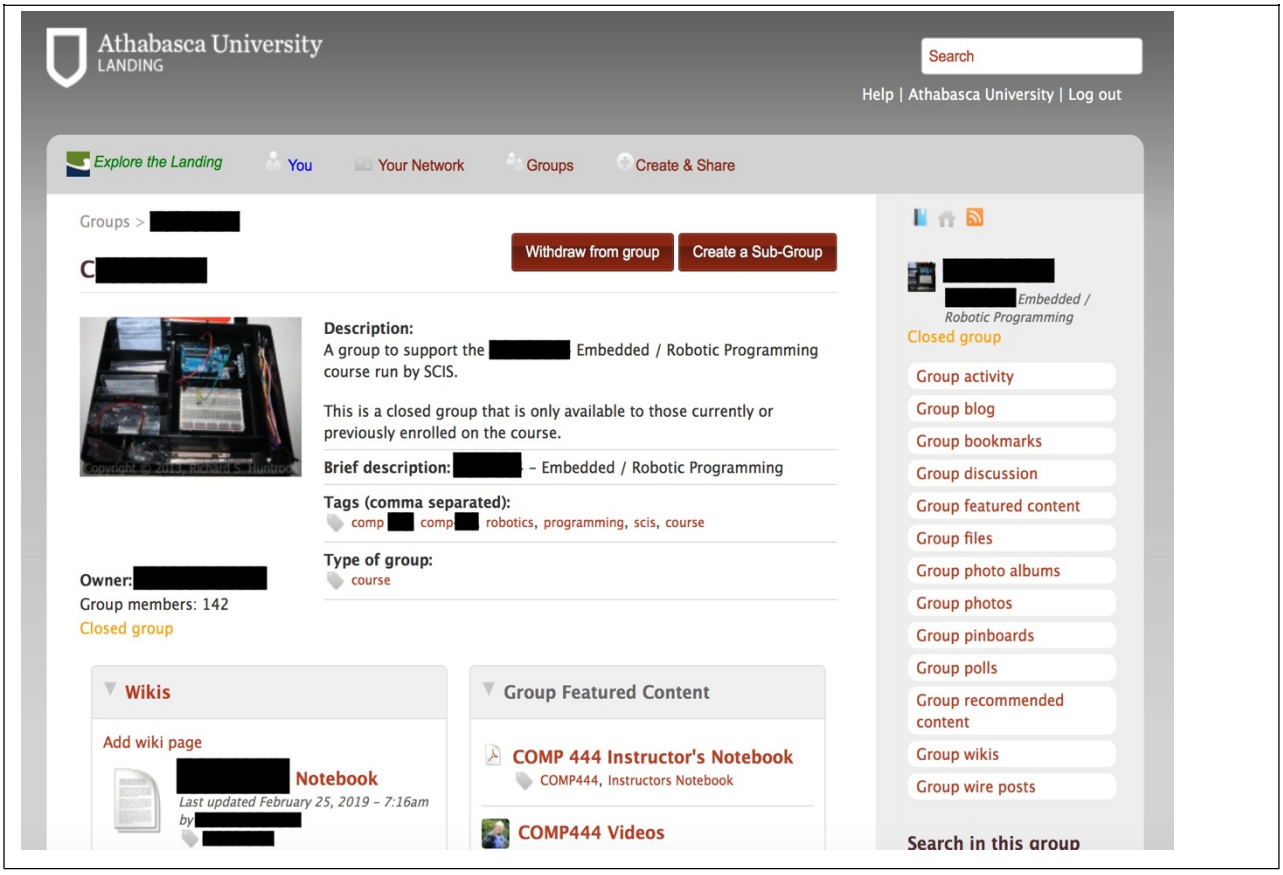


Figure 6. Partial screenshot of Case B home page. The sidebar on the right gives access to the various affordances available to students.

Teaching presence indicators. Three teaching presence indicators are presented below.

Direct instruction. The first group of indicators address direct instruction.

Table 13

Teaching presence indicators coding references – Case B

Direct Instruction	Instructor coding references	Student coding references
Coding references	42/579	537/579
Present content, questions for consideration	23/260	237/260
Confirming understanding through assessment and explanatory feedback	0/117	117/117
Injecting knowledge from diverse sources	6/147	141/147
Responding to technical concerns	3/31	28/31
Focus discussion on specific issues	6/9	3/9
Diagnosing misconceptions and errors	4/14	10/14
Summarize the discussion	0/1	1/1

Present content, questions for consideration. Of the 579 coding references reflecting direct instruction indicators presenting content, questions for consideration comprise the largest number of coding references – 260 in total, which represent 45 percent of the total coding references in this category. These posts stated information without explanations addressing how or why something occurs.

The instructor posted almost 10 percent (23 of 260) of the posts for this indicator. Almost half the posts are self-disclosures revealing the instructor's work with various programs. Within these posts, he injected information about the features of these programs and short bits of information about his experience with them. Seven of the 23 coding references address coding and programming exclusively. Four of the coding references address design elements - either

information directing students' participation or explanations of the course history and the reason for the choice of text for the course. The course is designed to allow students to create a repository of information that both shows the student's expertise and shares information with others in the course. The course creator added a Wiki to the course tools to allow students to add information to the course.

> This WIKI is a place to start gathering information that's not covered elsewhere in the course. Things like information about circuits or following the circuit diagrams, or how to create a video of your project, or how to hook up motors in a larger project. C2-I1

Students illustrated the same approach in posts like this:

> For this reason, I have modified my sketch to constrain values to 0-135 (+25). This will allow operation within this full range without putting stress on my servo. The changed lines of code is as follows: position = constrain(position, 0, 135); ~~ servo. write (position + 25); C2-S8

These posts allow students to put their work forward for others to consider. Once the work is complete, solutions are presented with a level of confidence as the work itself has provided the feedback for students to know their approach was correct. While each post addresses specific aspects of the project, taken as a whole, the site contains a great deal of information collected from many students and their experience completing their projects.

Injecting knowledge from diverse sources. Students are required to collaborate with others and this often takes the form of injecting knowledge from diverse sources. Over 25% of the posts coded in the category direct instruction referred to this indicator. Many of these posts contained URLs for sourcing parts for the robots. The links to several technical guides were posted allowing students to share their growing expertise and knowledge base. Students also posted articles which informed their work:

> String Concatenation & Memory Management * Memory issues using C++ operator + on strings I submitted this article in hopes that other students may avoid this pitfall. As a result of this article I remove the use of C++ strings the Song/dance generator. C2-S2

The clarity of such a post makes it a resource that has the potential to help future students encountering the same difficulty in their project.

> Posts that elaborate on topics introduced in reflective activities attached to course

readings may not receive immediate comment but reside on the course site to add to the body of knowledge being housed there. The article cited in this post adds another dimension to the discussion of consciousness: "Consciousness creep . . . What I found most interesting about this article was the table they used for splitting intelligence into levels". C2-S

Many of the students posted links to their YouTube channels where they had uploaded video of their projects to document the work they have done. Students are able to use this technology to demonstrate their learning to the instructor and also leave a record of their work for other students to access. This is a way to inject knowledge from a different source and serves to develop a body of knowledge to support subsequent students' understanding. The use of an open site like YouTube also extends students' exposure to the general public.

Confirming understanding through assessment, explanatory feedback. Confirming understanding through assessment and explanatory feedback refers to posts in which students demonstrate their understanding of the course materials. This indicator accounts for 20% of the coding references in this category. All of the 117 coding references for this indicator came from student posts. By giving the instructor feedback concerning their level of knowledge of both technical aspects of their project and ideas that support them, students benefit from the confirmatory exercise of verbalizing their thoughts. This provides the opportunity for reflection on the processes she has developed to make her project work.

> The overall idea is to use the PIR to determine if it is safe to turn off a light due to no motion being detected. This sketch will not be inclusive of all of that but will merely be a test to ensure that the PIR is connected and working properly. C2-S1

This post demonstrates how she confirmed her understanding of one aspect of her technical work. Many of the posts described similar testing of the technical aspects of their projects. Other posts detailed the thought processes that led the student to make choices on how to proceed.

> To start with, I had to decide how many degrees of freedom I wanted. I had to look at what kind of motor I wanted to use for the joints. I had to decide on what material to use for the body and what the dimensions should be. After viewing several videos (on YouTube), images and tutorials, I finally had a good understanding . . . C2-S13

The physical aspects of the course work - robotics and embedded processors allow students to get immediate feedback as to the workability of their design. Most of their posts describe the process they used to get the various parts of the robot or processor to work. The act of verbalizing their procedures in a logical format encodes these processes in the student's

knowledge structure and deepens her understanding as well as allowing the instructor access to the student's strategies and reasoning.

Student posts in response to the theoretical questions which have no one definite answer allow students to deepen understanding of the broader questions posed by the field. For example, a student posted "I think learning, epecially (sic) emotions and behaviors could make robots less predictable and thus more frightenting (sic)." C2-S11 This statement demonstrates the student's use of critical thinking skills and allows her to speculate about robots' potential.

Responding to technical concerns. While having the opportunity to reflect on the future of robots, the course is grounded in reality and so the indicator: responding to technical concerns is exemplified in several ways. The instructor responded to some technical concerns: "From slashdot: The summary is that the Microsoft 2015 Visual Studio inserts telemetry code into ALL compiled binaries." C2-I1 but students posted the majority of the coding references (28 of 31 or 90.32%). Several posts proactively addressed a concern expressed on the site, anticipating future difficulties: "I posted this hoping that people will not make the same mistakes as I did". C1-S2 Similarly, a number of the posts illustrated problems students encountered. They too, posted their response to their own concern so that other students could benefit from their experience - in addition, of course, to demonstrating their problem-solving skills for the evaluation: "I had to shield the motors (Create a Faraday cage." C2-S2 Other posts were also in response to problems and offered solutions. "I noticed this too, . . . so you could add multiple photoresistors". C2-S7 In summary, the instructor, using a constructivist approach, responded to some technical concerns by giving information that the student can use to make up her mind: "As for Linux I'm not so sure. It worked on Ubuntu 14 but not 16." C2-I1 By supplying information without prescriptive guidance, the instructor allows the student to choose the approach that best fit her understanding of her learning needs.

Most of the posts detailed students' own response to their own technical concerns. Posts ranged from describing the difficulty of finding the right size motor to power a robot over grass to sharing solutions to solve problems with finicky sensors: "I noticed this too, the LED doesn't dim noticeably unless you really cover it. One thing that might work". C2-S7 There was a sharing of responses when students were unable to solve their own difficulties, but in general, these were addressed by the students in their own work and then recorded for sharing and assessment.

Diagnosing misconceptions. Diagnosing misconceptions also includes addressing misconceptions, as a diagnosis needs to be acted on to be effective. The course instructor, whose posts accounted for four coding references of the 14 for this indicator, addressed a misconception raised by one of the students regarding the design of the course, explaining "there is no programming prerequisite; I did that very intentionally" C2-I1 and addressed misconceptions regarding the process for submitting work for the course. The majority of the remaining 10 coding references that illustrated this indicator were concerned with technical difficulties encountered with making their project work. In enumerating these difficulties, students share approaches and solutions, leaving a legacy for subsequent students to use in their own projects.

Focus discussion on specific issues. This tight focus on their projects is also illustrated in the indicator focusing discussion on specific issues. Discussions were focused on such topics as, where to post information on the site, to technical topics like subsumptive architecture, to ideas for how to scavenge parts for use in projects. Students posted twice as many items coded to this indicator as the instructor (six as compared to three by the instructor). Only one discussion actually involved an exchange of ideas with other course participants. A student posted about her robot crashing during a song it was programed to sing. She posted her solution, and this elicited a response from a fellow student inquiring about the range of her string (a series of characters used in programming) and a compliment from the instructor on catching the problem and fixing it. Two of the posts made by the instructor in this course do stand out due to the fact that they respond to a rather long review of new devices that one of the instructors in Case A was reviewing. In addition to adding information to the body of information available for students to use, these posts give students insight into the discussions undertaken by instructors when they are examining the various aspects of the tools they use. This insight allows students to participate as observers and to learn by using a more proficient participant's example - an example of the instructors' use of design elements to increase agency to include students in the type of conversation that traditionally was the purview of instructors.

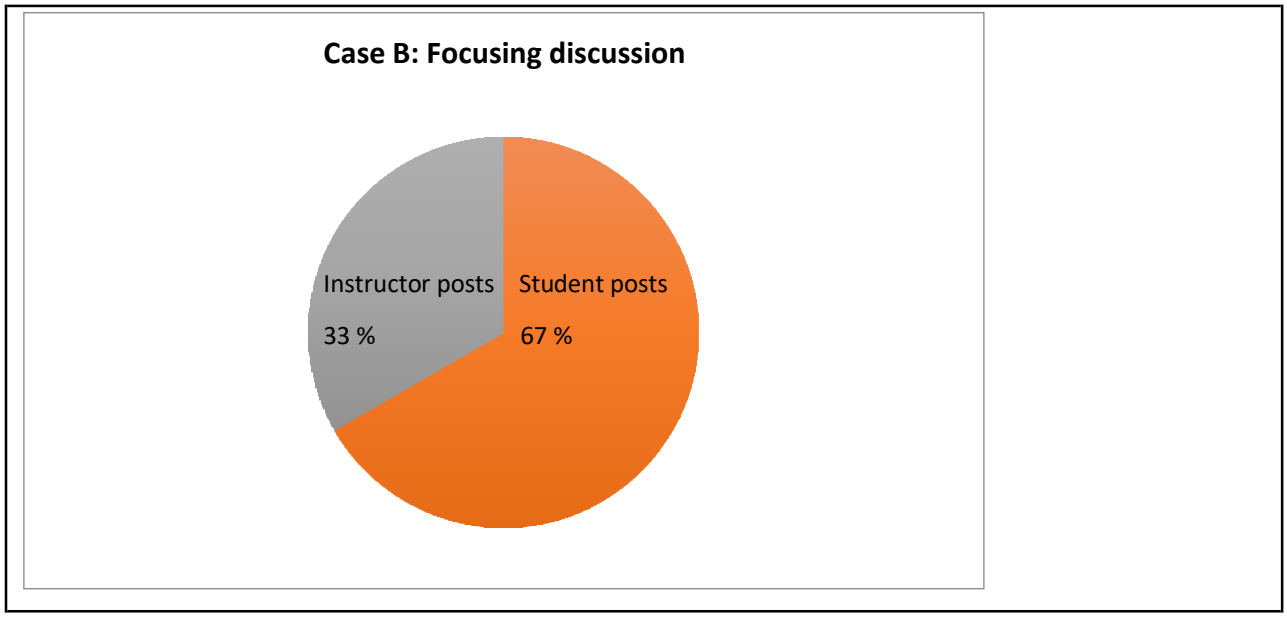


Figure 7. Post authorship in Case B.

Summarize discussion. There was one coding reference for this indicator in Case B. The reference is the statement that a student posted to conclude the unit summary in her learning diary reflecting a formal approach to writing an academic submission that was not generally used in this group environment. A possible reason for the lack of formal approach to presenting their academic work will be discussed in the next chapter.

Instructional design and organization. When flat architecture, discussed above, is part of the instructional design and organization of a course, both the instructor and the students participate in designing the learning experience. In response to a lengthy discussion prompted by a request for thoughts regarding the quality of the course text and a request for information on reading circuit diagrams, the instructor published a series of posts which revealed his thought process regarding addressing these concerns. Rather than prescribing solutions, he decided to start a discussion topic: “things you would like me to do for the course. These are great ideas and I will work on them”. C2-I1 Minutes later, he posted “I think I’ll start a WIKI, so anyone can contribute. That way it’s not just me saying but everyone having a part in making this course better.” C2-I1 Minutes later, he posted “This WIKI is a place to start” C2-I1 This series of posts conveys several messages to course participants. The first is that the instructor is continually redesigning aspects of

the course to meet student needs. The next post, in which he announces that he will start a WIKI to which every participant can contribute, reinforces the course design's flat architecture by recognizing that student contributions are as valuable as those made by the instructor. This post also explicitly states that the course is a co-creation as well as a work in progress. A third message is implicit in the speed with which he posted the creation of the WIKI. This speed indicates that their participation is so important it must be facilitated immediately. The instructor's action also illustrates the responsiveness offered by the course site. With a few keystrokes, he can change the course structure and gain the potential for input from 15 participants., an action which reflects the soft nature of the site design.

Although the instructor makes decisions about the macro-design of the course, these decisions give students degrees of control over the micro-design of their learning. This control is reflected in the focus in student posts. Most of the posts centered on design aspects of code and the physical structure of the robot. Many of the posts included links to video of the particular design feature that was being discussed.

Table 14
Instructional design and organization indicators coding references - Case B

Instructional Design & Organization	Instructor coding references	Student coding references
Coding References	23/104	81/104
Designing methods	9/36	27/36
Establishing netiquette	2/18	16/18
Utilizing the medium effectively	11/46	35/46
Establishing time parameters	0/1	1/1
Setting curriculum	1/3	2/3

Utilizing the medium effectively. Almost half the indicators in the category reflected evidence of utilizing the medium effectively – 46 of 104 coding references. As in Case A, only notable instances of this indicator were coded on the understanding that everyone who posts to the site is using the medium effectively. The above discussion in which the instructor announced a decision to begin a wiki is also an illustration of using the medium effectively both tacitly and explicitly. The instructor, who made 23.91% of the coding references for this indicator demonstrated to students that the medium is what Jon Dron terms soft and open to being changed based on their needs (Dron & Anderson, 2014. p. 23). The phrase "everyone having a part in making this course better" C2-I1 explicitly indicates to students that they are creators of the course and their experience, as much as the instructor is, and with this post elevates the student experience to designing on a macro or course level as well as designing their experience on a micro-level.

As mentioned above, the instructor also used the site to participate in a discussion with another instructor on the Landing, giving students access to a discussion of the advantages and disadvantages of various software and hardware. By posting this discussion on the Landing, the instructor gave students access to a discussion that addressed a broad view of the utility of various technologies. This allowed the students to witness a thoughtful, respectful discussion conducted on a professional level. In both these instances, students are being given the experience of apprentice participants with insight into the thinking and actions of professional academics who are sharing their expertise.

Students generally used the group site to highlight their work using photos and video to show their results at various stages of development. Figure 8, below, shows how the student can include drawings to illustrate details of their design. This affordance makes the information accessible for people who have not worked with this hardware and increases the value of the post. This combination of affordances – videos offer similar advantages – adds clarity to the student's words and increases student confidence that the instructor will understand and appreciate her design thinking. For example, this student offered video of work: "Video of successful wheel rotation can be viewed (with excitement): HERE". C2-S8

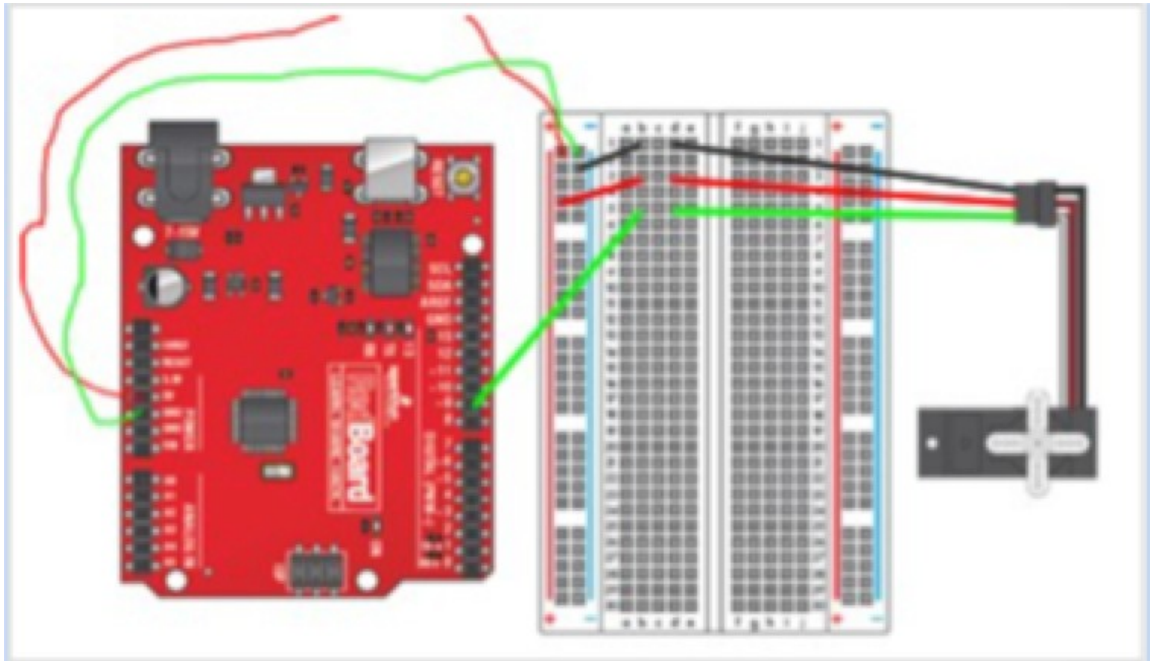


Figure 8. Screenshot of customized diagram.

The added affordance is the information that is archived and accessible to other students form an environment where aspects of a master/apprenticeship or a community of practice situation is created. The distinction between the apprenticeship model and the community of practice model will be discussed later.

Less experienced students are able to access the information conveyed by the more experienced student in the photo or video and use the image to inform their work and learning. In this way, a student is able to have her repertoire of design methods supported and expanded.

Designing methods. The course designer illustrated designing methods in his series (three) posts in which he moved from answering a post saying that he would start a discussion topic and start working on the ideas suggested in the post. In this post, he is performing the traditional role of the instructor – making decisions and managing students' learning for them. A second message posted three minutes later, shows his progression in thinking from the hierarchical approach of traditional instructors to the flat architecture which gives students agency to co-create their learning experience. His thinking moves from a discussion forum in which he develops topics on which students want information to a WIKI "so anyone can contribute. That way, it's not just me saying but everyone having a part in making this course better." C2-I1 The message illustrates

that both the instructor and the students are partners in improving the course. While the design element is important, there is a powerful message in the explication of the instructor's thoughts – students are accepted as partners in design. The instructor acted on his decision and four minutes after the second post created a third post announcing the beginning of the WIKI as a place for "everyone to contribute, not just me." and explained that the WIKI is related to the discussion he created to deal with suggestions for things to discuss in the course. This distribution of knowledge is reflected differently in another aspect of the course.

In response to a student query about textbooks for the course, the instructor cited the abundance of information on the Internet – information contributed by many users who have qualified as knowledgeable by means of experience rather than credentials. C2-I1 The instructor then made a decision to use this distributed knowledge supported by discussion as a means of maintaining course currency, empowering students and prompting student learning.

Students, who made 75% of the design coding references, focused on the micro-design used to design code and the moving parts of their devices. In sharing codes and methods to overcome challenges with the physical design and circuit interfaces, students are creating a useful resource for fellow students and those who will follow. They also increase their social capital and move closer to becoming recognized for their expertise, both by fellow students and the instructor who will evaluate their efforts.

Despite the agency granted to students through the course instructional design, one student post showed evidence of lingering notions of traditional approaches to education. He questioned the efficacy of "timely discussions" C2-S6 when people are on different schedules and may have already completed the course. He also questioned the value of '"forced" C2-S6 collaboration as his experience showed little substance in these posts. Another student expressed her lack of confidence in her ability in stating: "Without reading ahead to find the proper method," C2-S8 and then went on to describe her method for measuring torque. In a later post, the same student stated: "I've already answered the first half of this question based on my own analysis, so this time I have looked up the real answer". C2-S8 Both of these posts indicate a reliance on credentialed outside source of knowledge as being correct. All three of the posts discussed above indicate either a lack of awareness or acceptance of the course design elements of co-operative learning and reliance

on fellow students as valid knowledge sources despite the course designer's discussion of the pedagogical basis for sharing on The Landing (A Brief "How-to" page in the Embedded/Robotic Programming – Introduction to Robotics accessible on the sidebar on the main page of the course site).

Establishing netiquette. Like diagnosing misconceptions, establishing netiquette needs to include the concept of maintaining it to become an accepted behavior. There were 18 coding references for this indicator. The instructor made three or 16% of the references with students posting 15 or 83% of the coding references. While this may seem to indicate a lack of netiquette, these references represent efforts to recognize the human aspects of studying robotics. The following expands on the qualifier used to code this reference.

On this e-learning commons, students have agency as contributors to participate with the instructor to establish netiquette and then maintain it. Sturges' (2002) heuristic: remember the human - an irony in a robotics course - describes the behaviors this identifier encompasses. These include comments that reflect the need to know how to navigate the course site, quips that lighten the mood and reflect the humanity and personality of the person posting as well as the common greetings used in daily conversation.

In addition to the announcement of a wiki to gather resources for the course as discussed above, the instructor punned on the term test suite in a blog post title. Students jokingly commented on the backgrounds in photos posted to illustrate work. Another student named her robot "Jim because he looks like a Jim." Others commented on how much they enjoyed the challenge the course offered while others reached out to help fellow students. These examples of netiquette add a human face to what could be a sterile environment defined by lines of code and circuit diagrams and contribute to the sense of community in this self-paced course.

Setting curriculum. There were three coding references for this indicator. The instructor made one and students made two. Nevertheless, members participate in creating learning experiences while setting the curriculum by adding material to the course material. While the curriculum is set by the course creator/instructor at a macro level, the course design allows for changes to meet student needs at a micro level. These changes were made by both the instructor for actions affecting the course structure and by students in decisions made regarding the design of each student's individual learning experience and the design of their code resulting in their robot or embedded processor. Decisions about individual design elements for each learner's experience were ubiquitous and so were not coded as setting curriculum references because they were a

required course activity.

The instructor illustrated the soft (malleable) course design in a series of posts addressing changes he would like to make to the course which were addressed in the discussion on designing methods. Methods are a significant part of any curriculum and are the instruments by which the course content is manipulated by the students in their construction of knowledge. As discussed above, during the three-month duration of this investigation, the instructor added a discussion component to the course which he named "Things you would like me to do for the course." Within minutes he added a post stating that he would include a WIKI so that students could also post helpful information and so that all participants could contribute, "not just me." C2-I1 This post indicated an overt change in curriculum design and signaled students that they are co-creators of their learning experiences. Several students made multiple contributions to the discussion in the spirit of increasing the knowledge base used for the course.

The instructor also commented on his deliberate decision to forgo programming prerequisites for the course. He wanted the course to "be open to anyone interested in robotics and embedded processors, not just "programmers," and cited enthusiasm and interest as the motivation for learning with the comment: "Keen interest and enthusiasm will go far with new technologies – just look at how K-12 students outpace their teachers in most robotics classes. :)". C2-I1

The first of two student posts coded to this indicator traced the emergence of the instructor's decision to create the discussion "Things you would like me to do for the course" and mentioned finding a tutorial to fill knowledge gaps that students found in the materials currently in the course. This student was aware of the benefit of recording the location of these tutorials would provide for future students in the course as well as an awareness of the course structure and the position students hold as co-creators of the course. She recognized that students help set the curriculum by providing content and tutorials that support student learning. This understanding of the course structure and the curriculum was not common to all students.

One student commented on his struggle with the collaboration requirements for the course. He had difficulty reconciling a self-paced course with making timely discussion contributions. He saw the collaboration requirement as forced and perhaps inappropriate. Despite his objection to collaboration, this student stated that he "read over 30 other students (sic) wikis as I progressed through each unit to help get my juices flowing and think a little outside the

box". C2-S8 His conflict reflects how familiarity with traditional learning styles can hinder recognition of the affordances of constructionist learning environments and how the design of the curriculum affects student participation.

Establishing time parameters. There was only one coding reference that illustrated establishing time parameters. Like many of the other indicators, this is one that is set by students rather than the instructor who is bound by institutional timeframes. This student post merely indicated that she would be taking the course quickly "out of necessity." C2-S8 There was no further explanation and the post indicates the agency students have to complete the course within the time parameters that suit the student's particular life circumstances.

Facilitating discourse. Facilitating discourse, which consists of indicators describing setting a climate for learning, encouraging, acknowledging, or reinforcing student contributions, identifying areas of agreement or disagreement, drawing in participants, prompting discussion, and seeking to reach consensus or understanding are integral to the exchange of ideas. Coding references for facilitating discourse represent just over one tenth of the coding references for direct instruction. This ratio may be due to the course subject matter and design.

Encouraging, acknowledging, or reinforcing student contributions. Encouraging, acknowledging or reinforcing student contributions is an action led by instructors but also practiced to some extent by students. The instructor showed almost two thirds of the coding references for this indicator (11 coding references representing 61% of coding references as opposed to 7 or 33% of student coding references). The course instructor's willingness to include student input into the course materials illustrates this indicator by first encouraging and then acknowledging student contributions. These contributions are reinforced when the contributor and other students see the reference in the wiki as illustrated by this post from C2-S13 "I started a discussion on possible project ideas which attracted much participation from other students." This can become a self-perpetuating cycle in that students see the acknowledgement of the contribution and the reference on the wiki and become motivated themselves to suggest a reference. This set-like behavior adds to the value of the site in contributing to it becoming a learning resource that is dynamic and up-to-date.

Table 15
Facilitating discourse coding references per participant – Case B

Facilitating Discourse Coding references	Instructor coding references	Student coding references
Coding references	24/65	41/65
Encouraging, acknowledging or reinforcing student contributions	11/18	7/18
Setting a climate for learning	7/24	17/24
Seeking to reach consensus, understanding	0/4	4/4
Drawing in participants/prompting discussion	4/8	4/8
Identifying areas of agreement/disagreement	2/11	9/11

Setting a climate for learning. The instructor's role in setting a climate for learning rests in course design and in establishing an atmosphere in which students can construct their learning. He made seven of the 24 coding references for this indicator. The instructor added a wiki so that students could co-create course artifacts and made suggestions for projects students could undertake for the course. He congratulated a student on "excellent troubleshooting" C2-I1 and added the reasons he found the post to his liking, giving other students insight into what aids his learning. The remaining instructor posts discussed his research in robotics beginning with an apology for a pun using a technical term. The use of a pun subtly reinforces the bricolage or tinkering play in which the researcher indulges and sets a tone that underscores the human elements of the course.

There were 17 coding references from student posts representing 70% of the coding references for this indicator. The accounts of student successes in overcoming challenges are left here as references and inspiration for future students. C2-S2 contributed this post which "discusses all of the challenges I encountered when implementing Radio frequency communication. I posted this hoping that people will not make the same mistakes I did and have a much easier time implementing radio frequency communication".

One student reported an unusual instance of setting a climate for learning. Her young

teen became interested in the student's robot and was intrigued by the process, spending a great deal of time observing the building. The teen has asked her parent to help her build a robot dog. The student was thrilled and calls this "probably the biggest take away from this course". C2-S6 The climate for learning, in this case, extended beyond course boundaries and became intergenerational. This anecdote resides in the course site now to provide inspiration and motivation for future students.

Identifying agreement, disagreement. The indicator identifying areas of agreement, disagreement may more properly describe activity in a course in which the focal point is the consideration of ideas. Regardless, the instructor posted two of the 11 coding references for this indicator. Both his posts expressed his agreement with student posts. One of the posts included a commitment to use student suggestions: "These are great ideas and I will work on them." C2-I1

Students, whose nine posts accounted for 81% of the coding references, readily expressed agreement and disagreement with ideas presented in posts. While agreement generally consisted of a phrase or two to indicate the degree of consensus, disagreement was generally substantiated with the reasons for disagreement. This lengthier post illustrates such a post:

> I would disagree here myself. The thermostat may be adjusted to a setpoint by a human user, but the decision to actually start/stop the furnace is made automatically by the thermostat. It contains a sensor that measures the ambiant tempurature (sic), then it reacts by starting or stopping the furnace to correct the tempurature (sic) to the human-defined setpoint. I struggle to call it robot on principle, but it does meet some of the criteria. C2-S

This documentation could prove useful to other students who might benefit from knowing why a student disagreed with a post.

Drawing in participants prompting discussion. Just as there were few posts illustrating the indicator described above, there are only eight examples of prompting discussion and drawing in participants. This is most likely due to the course's subject matter. There were several attempts to begin discussions in this course site. One student posted a query regarding the course text: "I'm curious what you all thought about the textbook." C2-S14

The prompt that received the most responses was a request from the instructor for students to make suggestions of things they would like to see in the course. Several students made detailed suggestions going as far as researching sites they deemed most beneficial before suggesting they be incorporated into the course literature. Although there were few coding

references for this indicator, the action had great impact for participants as will be discussed below in value creation stories.

Seeking consensus and understanding. There were even fewer posts illustrating the teaching presence indicator: seeking to reach consensus, understanding (four of 65). Students made all of these posts. They show evidence of seeking to reach understanding, whether needing a clarification of project requirements: "I just wanted some clarification on the project requirements." C2-S13 or trying to reconcile the concepts involved in robotic control: For behavior-based control, I think there is some room for argument. I would consider". C2-S14 Consensus is not something that contributes to learning in this course. Diversity is encouraged and the only consensus for this group is a fascination with robots and embedded processors.

Taxonomy of discussion indicators. The taxonomy of discussion indicators (Booth and Hultén, 2003) is designed to give an indication of how discussion moves students toward learning. The indicators: participatory, factual, reflective, and learning, detail the actions students can make to use discussion to come to a realization of new possibilities.

Participatory indicators. These indicators show evidence of student willingness to participate in learning activities and to move toward learning. Table 16, above, shows that students made the majority of posts in for all indicators except for acknowledging an earlier statement. There were 44 coding references reflecting participatory indicators. These indicators reflect the conventions that humans have established to function in social settings and show the cooperative nature of the actions in the course.

Referring to a person or what a person said. Just under one third of the posts in this category (31%) referred to a person or what a person said. Reference to a person or what she said is an acknowledgement that the person, or what she has said is noteworthy. Together with identifying oneself, this indicator (29%), comprises just over 60% of the coding references in this category. The percentage of posts either identifying or making reference to a person or what she has said shows that the participants were very aware of the need to identify both themselves and others for clarity and to humanize the environment. Many of the posts that referred to a person or what a person has said acknowledged help that had been received and reported on the results of implementing the intervention. "Wow that worked!! Thank you!". C2-S13

Table 16
Participatory indicators coding references – Case B

Participatory Indicators	Instructor coding references	Student coding references
Coding references	11/44	33/44
Referring to what a person said	3/14	11/14
Identifying oneself	2/13	11/13
Naming a person	1/5	4/5
Requesting (in a general sense)	0/1	1/1
Asking (in a general sense)	0/3	3/3
Acknowledging an earlier	5/8	3/8

Identifying oneself. The instructor posted two comments that identified himself. The first established his professional credentials and the second identified himself in terms of his computers and his reasons for using particular models. The majority of student posts reflecting identifying oneself were introductory, biographical posts. One student post however disclosed that she tends to only offer input when she feels that she has something to add that has not been mentioned or when she is able to help someone. She added that even though she did not mention that she was seeking help, she went to other students' posts "to gain a different perspective". She referred to herself as a student who proceeds with her work quietly, using the affordance of the students' archived posts to support her own learning

Acknowledging an earlier statement by name. A few posts (eight of the 44 coding references) showed evidence of acknowledging an earlier statement. This was a strategy used by the instructor more than by students (five instructor coding references and three student coding references) whose posts were short and gave information without embellishment. The instructor's acknowledgements ranged from a compliment for excellent troubleshooting and a description of what he likes to see in posts: "That's some really excellent trouble-shooting you demonstrated in your post. Well done! I love reading posts like this where not only do you describe what's going on, you describe your thought processes as well". C2-I1 Other acknowledgements praise student contributions to the course. Perhaps the most interesting acknowledgement is a post recognizing a

blog written by another instructor in which he reviews new computer products. As discussed above, this response gives students insight into informal scholarly discussion and demonstrates thoughtful, considered discourse.

Naming a person. Naming a person is an indicator that reflects the conventions of letter writing. Of the five coding references for this indicator, several posts used a person's name in greeting or as a signal the message had ended. However, like the indicators referring to a person or what a person has said and identifying oneself, naming a person can serve as a tag, a visual mnemonic that increases the post's recognition factor and eases the task of searching for a specific post.

Asking and requesting in a general sense. Asking and requesting in a general sense showed weak presence on the site (four coding references in total). There are several possible explanations for this. There may not be a need due to the levels of information available to the students. It may be a characteristic that people in this set share – they like to solve problems themselves without going to others for help unless they have a very specific request.

Factual indicators. Factual indicators show one of four types of factual contribution: presentations, proposals, eventual solutions or requests for facts related to the problem. They accounted for 21 of the 77 coding references in this category. As Booth and Hultén (2003, p. 79) explain: factual contributions "point to the project, to practical experience, or to the emergent solution.". Accordingly, the majority of the student posts which were presentations were not coded as factual indicators. Only posts which "refer specifically and exclusively to the problem in hand" (Booth & Hultén, 2003, p. 79) were coded for this indicator.

Presentations. The greatest number of coding references were to presentations (nine of 21). The instructor posted one third of these references on topics ranging from the purpose of a wiki site to information regarding his research "playing" with old programs using FORTRAN. These posts provide historical background describing early programming techniques as well as giving examples of the perseverance and attention to detail required to complete programming tasks. Like teachers from time immemorial, the instructor is using story-telling as a tool for exemplifying the behaviors necessary for success. While they do not address the problem at hand at a coding level, the do address the instructor's problem of providing an example of the behaviors needed to address the subject matter successfully. In this way, the instructor is providing an emergent solution to students who may need this example.

Table 17
Factual Indicators coding references – Case B

Factual Indicators	Instructor coding references	Student coding references
Coding references	4/21	17/21
Presentations	3/9	6/9
Proposals	0/5	5/5
Eventual solutions	1/5	4/5
Requests for facts related to the problem	0/2	2/2

Student posts, in contrast, were brief statements of fact illustrating either information from their experience or an emergent solution. This example typifies this in a post detailing the pros and cons of looking for gears: "I went looking for gears for my second robot and took apart an old non-functioning printer". C2-S2

Proposals and eventual solutions. Proposals and eventual solutions both represented just under one quarter of the coding references for this indicator. The proposal all related to students' project with varying degrees of detail in the five posts that were coded with this reference. Both the instructor and students made posts coded as references to eventual solutions (five references). The instructor's post referred to the discussion topic he began so that students could suggest additions he could make to the course site. Of the four student posts, one referred to the instructor's wiki and posts that the student made in response to the call for input. The other posts referred to specific solutions students found for problems they were having with their projects, for example: "My intention for the final project is to explore PID control in a much more in- depth fashion than I was capable in the past." C2-S8

Requests for facts related to the problem. There were two posts coded to the indicator: requests for facts related to the problem and both were made by students. One of the posts asked for clarification of the course requirements. While not specifically related to the problem of constructing her project for the course, the student's request illustrates her basic problem which is knowing the specific parameters for the course. Her request illustrates a transactional distance that the instructor bridged through his response on the course site. The other post asks for others' opinion of the course text. This post led to a discussion of the text, course

requirements, and eventually led to the instructor beginning a course discussion for students to suggest improvements he could make and then adding a wiki to the discussion so that everyone could participate in making the course better. This particular request for facts related to the problem had a distinct effect on the course design and illustrates the agency students are allowed in this course setting.

Reflective contributions. Reflective contributions are indicators that show the participant is examining the posts that showed evidence of reflective contributions. These indicators are defined by two statements: were questioning what is said, and substantiating agreement or disagreement with statements.

Table 18

Reflective contributions indicators coding references – Case B

Coding references	2/8	6/8
Substantiating Agreement/Disagreement	2/6	4/6
Questioning What is Said	0/2	2/2

Questioning what is said. Of the total of eight instances showing reflective contributions, two had coding references for questioning what is said. The first instance was the post in student questioned the choice of text for the course and asked for other students' comments. Her comment that the breadth of the text took away from its depth and the implication that another text would differ substantially both indicate that the student is questioning the suitability of the instructor's choice of text for this course. The second post questions the suitability of "collaborative requirements" C2-S6 for the course. Although the student is questioning the requirement, she adds that she considers how what she posts will help other students and admits that she has read "over 30 other students' posts" C2-S6 and that these posts have influenced her own work. Both these students' posts illustrate a change in how students participate in their learning experience. One feels able to question aspects of the course design while the second expresses ambivalence toward what she terms collaboration while being aware of her power to influence other students' thinking and making use of that affordance to support her own learning.

Substantiating agreement, disagreement with statements. There were six coding references for this indicator. The instructor made two references and students made four. The

instructor's posts were in response to a blog posted by another instructor who posted his understanding of the advantages of various computing devices. The student posts addressed diverse aspects of the course from coding designs to terminology. For example, this post refined the type of feedback received by robots: "Instead of positive/negative feedback it should be termed as constructive feedback. Robots learn from all feedback so it is constructive as they learn over time". C2-S

Learning contributions. Learning contributions in Booth and Hultén's (2003) taxonomy consists of statements that show the learner is open to new possibilities illustrated by statements of discernment and refinement of ideas. They caution that there are no specific verbs to indicate learning contributions, but that the action can be identified by what precedes and follows the discussion. There were four responses coded as learning contributions. These posts reflected two different aspects of learning. Two of the posts concerned the course requirements in general. A student described her exchange with another student leading to conclusions regarding the granularity required for responses and the issue of using other students' sources to support learning. The remaining two posts addressed technical problems and how they could be solved. Both sets of posts were the culmination of a series of posts in which students weighed the factors concerning them.

There was little extended discussion in this course due to the nature of the course wherein students addressed their projects without extended discussion. One student did question the usefulness of the text for the course and prompted a discussion about the approach to the course that resulted in the instructor adding elements to the course design to permit everyone to contribute content. The value this adds to the course is discussed below.

Table 19
Learning contributions indicators coding references – Case B

Learning Contributions	Instructor coding	Student coding references
Coding references	0/4	4/4
Statements that show learners open to new possibilities	0/4	4/4

Value creation cycle indicators. The value creation cycle described by Wenger et al. (2011) includes five descriptors. The descriptor that was coded most often in this course was

knowledge capital showing over 75% of the coding references for the indicators. Activity and interaction showed the second greatest number of coding references with just over 21% and changes in practice showed 2.6% of the coding references for this framework. The other two descriptors: performance improvement and redefining success were beyond the scope of this study and so were not included in the coding process.

Knowledge capital. Knowledge capital has potential value in Wenger et al.'s (2011) framework because all of its value is not immediately realized. The posts referring to this indicator reside in students' discussion posts and summaries of activities. Wenger, Trayner, and de Laat (2011) identify five aspects of knowledge capital: human capital or personal assets, social capital – relationships and connections, tangible capital – resources, reputational capital – collective intangible assets and learning capital – transformed ability to learn. (There were no coding references for learning capital in this case, so it is not discussed here.)

Table 20
Knowledge capital indicators coding references – Case B

Knowledge Capital Coding References	Instructor coding references	Student coding references
Coding references	5/205	200/205
Tangible capital	5/180	175/180
Human capital	0/21	21/21
Social capital	0/4	4/4
Learning capital	0/0	0/0

Tangible capital. Tangible capital, pieces of information, tools, and overwhelmingly links and references to websites and tutorials for the course, provided the most coding references within the category. Just under 88% of the coding references were identified as tangible capital which refers to resources that a student can access because of participation in a community or network. Over 97% of the coding indicators were student contributions. As part of the process of describing their learning activities, students in the course provide a great number of resources that become available to other students who search student "students and what I have learned" (a learning outcome). Students summarized learning activities specific to their own project as well as posting videos and links to

questions answered and asked and links to discussions in which they participated. These summaries are intended as a way of having students show that they have met the course learning objectives and as a secondary outcome providing a means for students to record their learning processes adding another dimension to Wenger, Trayner, and de Laat's concept of tangible capital.

A post in reply to a query from another student quotes from the study guide published on the course Moodle site.

> A key component of this weblog is mapping your robotic explorations and exercises to the course objectives; that is, taking the list of objectives for each unit as an outline, you will explain how the activities you have completed enabled you to meet each one. In this way, you will establish a portfolio of competence that will be reflected in your final grade in this course. (p. 6)

In providing the instructor with a portfolio of competence, students detail their thought processes and reasoning. The publication of the portfolio components in weblogs makes this evidence of growth toward competency accessible to all site members. While the original intent of showing evidence of growth to the instructor continues to drive the publications, a consequence of this affordance is the insight into thinking and design processes these posts allow subsequent students. The implications of this design feature will be discussed in the next chapter.

Human capital. Human capital which refers to information, skills, and perspective that aid in staying current in a dynamic field, accounted for just over 10% of the coding references in this category. Students made all of the posts for this indicator. This post illustrates information that led to skill development: "These exercises gave me some insight into an existing platform. I gained experience in identifying sensors and sensor space, degrees of freedom and in identifying a robot's effectors and actuators". C2-S12

The fact that the site is closed so that only course participants have access to it, minimizes trust concerns and students' common interest in robotics combined with their desire to be successful in the course gives their information credibility. The nature of the course content also affects human capital. The course material is largely factual, allowing students to easily contribute information and reports of skill development and changes in perspective. Much of the skill development in this course is recorded in photos and video creating a visual record for both evaluation and for future students' learning.

Social capital. Social capital accounts for under two percent of the coding references for this category. This indicator refers to connections and knowing who to ask for help. For many communities, social capital is fundamental, allowing for the possibilities of developing a common language, facilitating learning and communication. In this course, the references were from students. Three of the four indicators were questions addressed generally to all participants. This post is an example of a question addressed to other participants: "Has anyone ever tried something similar?" CC2-S15

There was one reference to asking the instructor for advice before proceeding with a project: "Before I went any further, however, I contacted C2-I1". C2-S1 As with human capital, it may be the topic that leads participants to work independently and so need less interaction with other participants to complete their learning and so need less interaction with other participants to complete their learn.

Learning capital. There were no coding references for this indicator. While there is evidence of student learning in the progress made in completing their processors, there is no way to determine if this learning approach will continue determine whether this learning determine if this approach will continue as participants leave the site after completing their course work It would be necessary to have a group or network with a more constant membership to be able to measure this indicators.

Activity and interactions. Cooperation is evident in the indicators for activity and interaction. Wenger et al., (2011, p. 19) consider this indicator to be "the most basic cycle of value creation". This indicator includes activities such as helping a participant with a difficulty, providing a tip for communities. In networks, it includes meetings, providing an address, asking a question of the network or passing on information.

Passing on information. Most of the coding references in this category were passing on information, a networking activity according to Wenger et al. (2011). The instructor made nine of the references coded as passing on information with posts such as "I'll see what resources I can find". C2-I1 Student posts accounted for the other 23 coding references. The information passed on in the student posts ranged from simple tips: "I found some double sided tape to attach the battery pack to the chassis," C2-S11 to lists of technical strategies: "How I have tried to overcome error 1 calibrating the accelerometer and gyroscope 2 averaging out gyroscope and accelerometer readings 3 implementing a Kalman filter 4 implementing a complementary filters 5 adding additional heuristics to calculations". C2 - S3

Both posts from the instructor and from the students relay information gained from experience and generally discuss performance issues with the components being used to build their projects. This information serves to expand the body of information available to students to support their learning.

Giving input. Giving input is another form of activity and interaction. Just under 30% of the coded references reflected giving input. As in Case A, coding references for giving input refer to offering opinions or advice – subjective contributions. Of these, the instructor contributed one post and the other 16 were student contributions. One student contribution gave the reason for not including pictures of her work: "I did not take photos of the soldering process while I was at work, as I was working in a borrowed well-ventilated space within limited time. Good photos will follow!". C2-S8

Table 21
Activity and interaction coding references – Case B

Activity and interaction coding references	Instructor coding references	Student coding references
Coding references	11/57	46/57
Giving input	1/17	16/17
Passing on information	9/32	23/32
Providing colleague a tip	1/6	5/6
Helping a member with a difficult case	0/2	2/2

Wenger et al. (2011) consider this a networking activity and so these posts indicate evidence of networks within the course interactions. The input in student posts related to their projects and occasionally injected bits of humor into the statements. Students showed their pleasure in their creation with comments like: "The peizo buzzer is used to play a tune. I may be working on creating a peizo masterpiece of my own in my free time now". C2-S8 The instructor's post also injected humor into the statement by punning on the test term for programming testing – a test suite. His post was sub-titled: "How suite it is ☺" C1-I

Providing a tip to a colleague. Providing tips to a colleague received just over 10% of the coding references in this category. Most information provided by students was in the form of websites, links, and tutorials. The instructor provided on tip in the form of information about an undocumented work-around for a problem a student was having. Student posts concerned technical matters like testing parts before attaching them to the main project. "I've found bad breadboarding wires fresh out of the package before". C2-S7 One post provided the location of the course collaboration guide. Perhaps the most sincere, heartfelt tip came from a student who posted: "My advice to you as a student just finishing this course: Don't forget your collaboration requirement until the last minute!". C2-S8

Helping a member with a difficult case. The two coding references for this indicator came from student posts. One reference offered advice on what to submit for evaluation: "I've provided a break-down of my process for submitted assignments 2 &3". C2-S2 The other reference offered a solution for a technical problem: "I noticed this too, the LED doesn't dim noticeably . . . so you could add multiple photoresistors with different pull-down values". C2-S7 These posts reflect the agency students enjoy to use their knowledge to help other students and the opportunity they have to display their knowledge for the instructor.

Changes in practice. The least coded reference in this category was changes in practice.

Table 22
Changes in practice coding references per participant – Case B

Changes in practice	Instructor coding	Student coding references
Coding references	0/7	7/7
Changes in practice	0/7	7/7

There were seven student postings and no instructor posts that referred to changes in practice. Student posts reflected changes to their robot design and coding. Although the instructor made a change in practice that affects the course design and gives students a vehicle with which to exercise their agency, there was no evidence that the change was actually incorporated and taken up by students.

Student posts for this reference address modifications to their work and solutions to problems encountered with their robots. One student posted: "As it turns out the magnetic field

from the DC motors drown out all RF (radio signals. In order for the radio transmitter/receiver to communicate I had to shield the motors (Create a Faraday cage)". C2-S2

The remaining indicators in this category: performance improvement and redefining success are beyond the scope of this investigation and so were not coded. This analysis of the indicators in this framework aligns with the analysis of the other frameworks and so will allow for a discussion of those frameworks using a common methodology for analysis. What follows is an analysis following the methodology outlined in their 2011 paper.

Value creation stories. Two volunteers – both students - from Case B completed value creation stories. These stories give insight into the value the course site on the Landing provides for participants and isolates aspects of teaching presence found in the posts. The interaction of indicators and the value creation stories connect the framework with participants' experience of teaching and learning on the Landing creating an indication of where practice lies in relation to ideal value creation.

Wenger, Trayner, and de Laat's (2011) concept of value creation cycles makes it possible to trace an action through cycle 1 which produces immediate value through productive activities– cycle 2, to cycle 3, the applied value of promising practices. Cycle 4 – a realized value base on return on investment and then cycle 5 – a redefinition of success completes the cycle although these last two cycles are not necessarily achieved.

C2-S2's value creation story mentions another student asking for others' opinions of the course text. This is a cycle 1 indicator – a productive activity that produces immediate value in the form of interaction with other students. In response, C2-S2 relates, the instructor created a WIKI to distribute participation in course creation. This is a cycle 2 indicator which produces potential value. C2-S2 posted links to tutorials that helped her with problems she had had in hopes that other students would access them and benefit. This is an applied value – a cycle 3 indicator – a promising practice. C2-S2 reports two levels of value for the cycle 4 indicator – realized value – a return on investment. On a personal level, C2-S2 reported value in adding to her marks, and in meeting with other students which made her feel "a part of the community". She saw the action of adding the information in her posts as creating a support system in the course. On an organizational level, C2-S2 stated: "Every contribution to the landing provides original content that the other student read and can use."

C2-S12 was the other participant from Case B who completed a value creation story. He saw the immediate value (Cycle 1) of the Landing as a medium for his course work which

allowed him to use his instructor's directions "available on demand so I could access them whenever and from wherever it was convenient for me". The course site on the Landing made it easier for him to access the text companion activity site which helped him develop "a deeper understanding of concepts" in the course. This led to Cycle 3 value, the promising practice of being able to use the guide to be sure required course elements were included in his posts which recorded his experience, activities, assignments and resources together with his work in one space on the Landing. The Cycle 4: personal realized value/return on investment for C2-S12 was the freedom the Landing site gave him to access course material on his time schedule allowing him to progress and complete the course at times that suited him. C2-S12 was unsure about the organizational value this provided for the university but did state that his experience reinforced his belief that a "flexible learning environment is better suited to me than a more rigid one" and that he sees this as an indicator of success (Cycle 5).

Below is a Value Creation Matrix for Case B. The value creation matrix shows the value reported by these two students in their value creation stories. Both stories identify that their view of value included a record of student experiences, activities and contributions. C2-S12 saw this as a Cycle 3 value, an applied value, a promising practice. C2-S2 viewed this as a Cycle 4 value, a realized value, a return on her investment. These stories taken in the context of the cycles of value creation indicators wherein the majority of the coded references showed knowledge capital with tangible indicators, reinforce the value the repository of learning journals provide for participants Tangible indicators: "privileged access to certain resources" include information sources, document, tools and procedures often in the form of a website or tutorial which students found supported their learning.

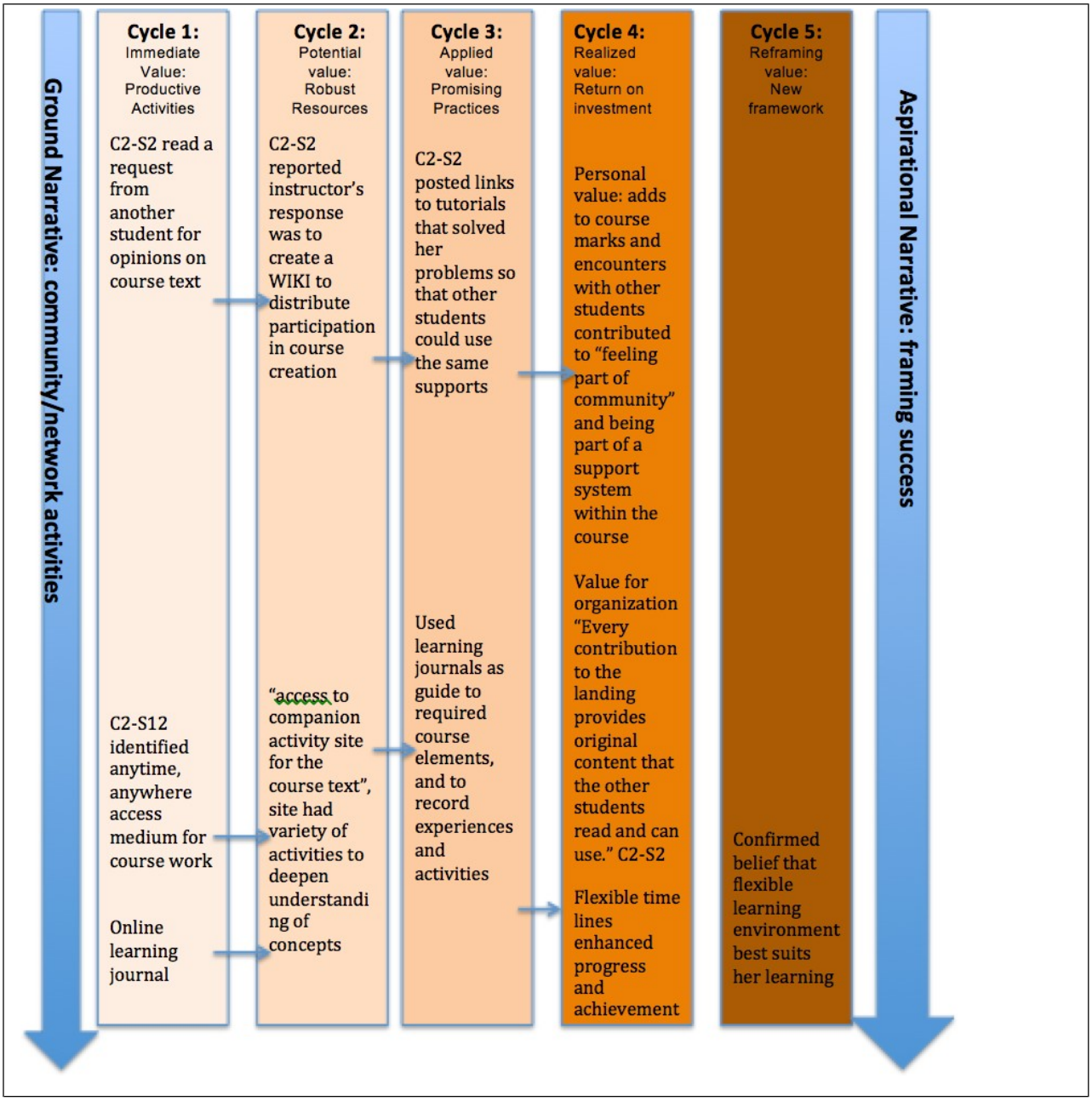


Figure 9. Case B value creation stories.

Groups, sets, and nets. While there is significant research on networks, there is limited literature defining the role of groups, and sets in e-learning and no reproducible method for identifying these social forms. The Landing, as an e-learning commons contains all three forms (Dron, & Anderson, 2015). The presence of groups, nets, and sets in the activity in these courses provides an environment in which participants teach and learn. These environments influence the activity that takes place in them and while the focus of this investigation lies elsewhere, these environments need to be acknowledged in order to complete the picture of teaching presence. As with

Case A, Dron and Anderson's (2015) rules of thumb for identifying groups, nets, and sets were used to identify the coding references.

Groups. There were 119 coding references posted for the group in Case B. These were posts that reflected characteristics of educational groups: activity that leads to accreditation, compliance with the group leader's requirements (in this case, production of a learning journal) and recognition of the permanent nature of the group. This recognition of continuance even without the presence of participants is a very subtle underlying element of the posts. It is illustrated in this post: "Being a CS course, this one is likely to focus more on theory and programming of the robot." C2-S8 The structured nature of the posts in the learning journals also exemplify the group nature of the posts.

Eleven of these were in posts from the instructor and the remaining 108 were from student posts. Both the instructor and students posted informational posts that add content to the group site. Although these were posted to the group, some posts exhibited the set characteristic of tags.

Sets. Set activity reflects the common interest in robotics that participants share. These posts are brief with no reference to specific participants. They identified specific aspects of robotics and offered directions to areas of the site where this information can be found.

There were 40 coding references for sets in this case. Only seven of the coding concerned a portion of the course participants. This post offers alternative ideas for the set of participants who are not interested in using a robot to complete the learning outcomes of the course: "Heres' (sic) another project idea that's ideal for those who want a project that requires ONLY the SIK as delivered with this course". C2-I1 Coding references from students were tags identifying keywords for the post. Posts targeted to specific interest groups and the tags from student posts illustrate two of the aspects of set characteristics.

Nets. Wenger et al. (2011) distinguish between the personal narrative or network and the collective network or social network. The authors caution that these personal networks are not separate but integrated parts of social networks. (Section 3.1) The nine coding references for nets were all from instructor posts and added to the collective network rather than being based on connections with individuals. The instructor included URLs for his original blog in seven of the

posts. The posts illustrate strategic sharing so that the information is shared as efficiently as possible and make up part of the collective network being developed in the course site on the Landing. Wenger et al.'s (2011) framework indicates that participation in personal networks leads to participation in social networks, however, there is evidence that the social network developed in the course site overshadows personal network activity. The intersection of networks, community and value creation will be discussed in the next chapter.

Groups, sets, and nets are not distinct social forms in Case B. Many of the posts share the characteristics of two or more forms. The largest form, the educational group is encouraged by the course design that not only encourages students to interact by sharing content and helping other students but assigns marks for each student's contributions.

Summary

Direct instruction is the category that produced the greatest number of coding references. Presenting content and questions for consideration and injecting knowledge from diverse sources reflected the most references in the category. Knowledge capital produced the second greatest number of coding references with tangible capital being the primary indicator reflected in the posts. Instructional design and organization produced the third greatest number of coding references. Utilizing the medium effectively and designing methods reflected the first and second greatest number of coding references for instructional design. Facilitating discourse had the fourth most coded references in this case. The other indicators showed small numbers of indicators as detailed above.

Chapter 6. Findings

Findings

This case study is an appreciative inquiry which investigated the teaching presence in two self-paced undergraduate courses partially delivered on Athabasca's e-learning commons, the Landing. The courses, junior and senior computing courses had enrollments of 53 and 15 students respectively with the 200-level course having the course coordinator and a tutor while the 400-level course had the course coordinator who was also the tutor. The tutor in the 200-level course contributed fewer than five posts and did not leave a significant record of his activities. The investigation looked at three months of posts to the closed, (members only) course site on the Landing using three frameworks.

The principle conceptual framework for the study of teaching presence is the teaching presence category of the community of inquiry (Garrison et al., 1999). Booth and Hultén's 2003 taxonomy of discussion indicators revealed the nature of discussion in the courses on the Landing. The value creation assessment framework for networks and communities developed by Wenger et al. (2011) was used to investigate the learning value for students on the site.

The Problem

Self-paced continuous intake course at Athabasca University present a challenge in the lack of contact for students learning outside an educational group or cohort. When working in isolation, they cannot benefit from the affordances of working in a community. Most of the online courses provided in Canada are based on a social constructivist pedagogical model (Anderson & Dron, 2011) that may not be appropriate for self-paced courses. This study investigates teaching presence from the community of inquiry framework (Garrison et al. 1999) in two self-paced, continuous enrollment undergraduate course at Athabasca University.

Research Questions

Three research questions framing the investigation are as follows:

How is teaching presence evident in self-paced courses on the Landing?

How does discussion promote learning on the Landing (if at all)?

What learning value does teaching presence on the Landing offer students and staff at the university?

These questions are supported by these questions:

How is teaching presence evident in groups, nets, and sets on the Landing, if at all?

What indications are there, if any, that the affordances of the Landing prompt learning using the

lens of Booth and Hultén's (2003) taxonomy of discussion indicators?

How does participation on the Landing help create a resource or resources that affect individual success and/or success for the organization?

Methodology

This case study is a qualitative, deductive investigation of teaching presence. Posts for each course – Case A and Case B – were transcribed, analyzed, using NVivo software, and coded for each of the indicators in each of the categories in each of the three frameworks. The posts were also coded for the presence of groups, nets, and sets. Following the coding, results were transformed from raw data to percentages and data reflecting the number of coding references per participant to facilitate comparison between Case A with 55 participants and Case B with 16 participants. Volunteers were recruited to tell value creation stories to compliment the information obtained from coding for value cycle indicators. Only four volunteers completed stories. Reasons for this will be discussed below. There were three students - one from Case A and two from Case B as well as an instructor. The information gathered from the analysis of value cycle indicators and the results from value creation stories were considered together to create a picture of learning value in Cases A and B.

Major Findings

Summary of cases A and B. In answer to the first research question of this study: To what degree is teaching presence evident on the Landing - it is evident to a high degree in both Case A and Case B in a very specific way. As shown in Figure 10 below, the coding references in both courses were predominately direct instruction indicators and instructional design and organization indicators representing the second largest number of coding references while facilitating discourse indicators make up the smallest group of coding references. The large number of coding references for direct instruction is a result of the design and organization of the course. The flat organization of both courses intentionally situates students in a position where they are expected to contribute to course content and in Case B to both content and course design. This expectation is explicit in the learning outcomes detailed on the course sites and re-iterated in posts from course instructors.

The course designs allow agency to students, both in their choice of project and learning materials through which to demonstrate their learning. Course organization allows students to proceed through to two checkpoints where the instructor or tutor assesses student work and gives permission for the student to continue. Prior to these check points, the course content – website

design and programming in Case A and robotic programming in Case B, provides feedback for the students. Feedback opportunities serve as formative assessment for students in that students can access the learning journals of previous participants or reach out to current course participants to give or request support. The constructionist aspects of the course allow for immediate feedback as the programming activities immediately let the student know if her programming was effective.

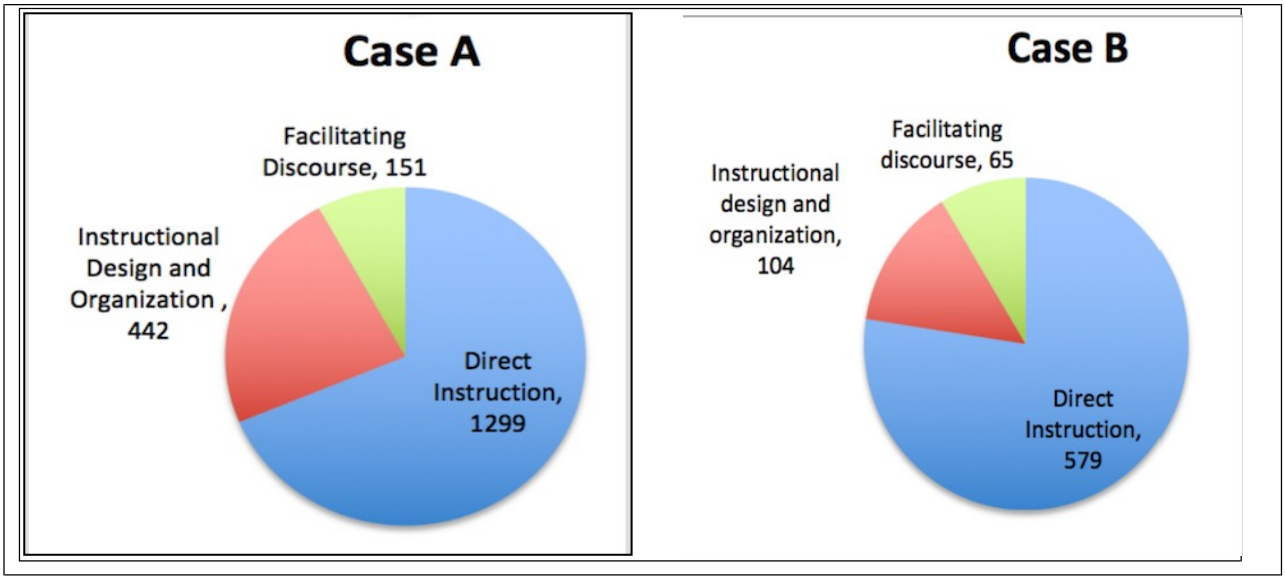


Figure 10. Teaching presence indicators by case.

Due to the design and organization of the courses, direct instruction (originating from students - not the coordinator) in the form of students reporting their learning activity is the teaching presence category with the most coding references. This sequence of actions illustrates the confluence of set, net, and educational group presences in these courses. Students interested in coding – a set, use networks to share information and solutions while registered in an educational group in the form of courses. This is discussed further in the following paragraphs.

Student contributions often take the form of brief exchanges, a characteristic of dialogue-based learning, and allow for an "infection model of learning" (C1-I1) wherein an idea is posted by a student, taken up by another and gradually spread through the group. This effect is recorded in the learning journals/diaries posted by students so that other students can make use of these ideas after the original posts. These posts are stigmergic traces prompted by the course designs and organization and are available to anyone with access to the course sites. This affordance will be discussed below in the discussion of the repository aspect of the course sites.

The teaching presence categories of presenting content, questions for consideration formed the greatest number of coding references for both cases. In using the site to present their thinking processes and results, they are able to confirm their understanding, trusting that in a course where summative evaluation is limited to an overview of their activity over the time span of the course, they will receive support and correction from other participants on the site if they are on the wrong track or unable to resolve problems. Indeed, confirming understanding through assessment and explanatory feedback provided the same high percentage of coding references in Case A as did presenting content for consideration. This indicates the students' use of their learning journals to both present their work and confirm their understanding through the process of reflecting on their processes for creating coding that made their website work. It also illustrates the non-traditional use of this teaching presence indicator. Rather than being a gate-keeping tool held by a knowledge holder, it becomes a learning tool available to all course participants. In Case B injecting knowledge from diverse sources formed the second largest group of coding references. This may have been due to the course requirements for collaboration. In a course where students are focused on robotic programming, injecting content may be seen as a way of prompting collaboration.

Injecting knowledge from diverse sources had the third most coding references in Case A, again reflecting a course recommendation and in both courses adding to the body of current information needed in a very dynamic field of study and reflecting the connectivist aspects of the course designs.

The action of responding to technical concerns formed a relatively large number of coding references in Case A (15%) perhaps reflecting the attention to detail needed in website programming, although arguably robotic programming is just as detailed. Responding to technical concerns formed only five percent of the teaching presence coding references in Case B. The difference in percentages may be related to the nature of the courses. Participants in Case A were building websites which are a tool for reaching out to people and prompting interaction. Participants in Case B were programming robotics which could be considered a more insular activity. The nature of people choosing each course or the influence of the activity in which they were engaged may have impacted their behavior regarding this indicator. Those designing and building a tool to reach other people may have influenced their decision to reach out for help when confronting a technical concern while those engaged in robotic programming may have been more inclined to solve technical concerns independently

thus minimizing the opportunity to respond to technical concerns.

The remaining indicators in both cases reflected small percentages of teaching actions in each of these courses. Limited diagnoses of misconceptions and focus of discussion on specific issues may be due to the limited amount of discussion in each course and the fact that discussion summaries are not part of the teaching/learning strategies for this pedagogical approach and subject matter. Student learning journals detail the students' thought processes and decisions through their building experience and serve both as proof of their learning and as a resource for future students.

The instructional design at a macro-level gives students agency to design methods on a micro-level when designing their codes and processors. In this way, design permeates all levels of participation in the course. The course creator uses design and course organization to create activities that allow the student a high level of agency and control. By listing learning outcomes and creating a series of activities that scaffold student participation in design activity, the course design gives students the agency needed to pursue learning in a form that suits them best. This design element coupled with the establishment and maintenance of netiquette prompts effective utilization of the medium. Students used the medium to ask for help and to offer it, to reveal discoveries of useful sites and tutorials, and to empathize with others' difficulties. Coding references, measured in percentages attributed to instructors as opposed to students, are evidence of the control students are afforded in both Case A and Case B. In courses where the instructor takes a transmission approach with students, the instructor is a knowledge gatekeeper. In a cooperative, dialogue-based learning environment, students have agency to take greater control of the information they source to support their learning. This reflects a dynamic which is the reverse of the traditional dynamic present in undergraduate course in brick and mortar environments.

Student posts constituted a greater number of coding references for all of the teaching presence categories than teacher posts. In previous studies of teaching presence, teaching presence posts made by the instructor were the majority of posts. This difference in post authors seems to be attributable to the instructional design and organization of these sites, which promotes cooperative learning in a dialogue-based learning environment. Previous studies focused on courses in which the teacher played a dominant role as knowledge transmitter and

creator of learning. This unique learning situation is discussed in greater detail in the following paragraphs.

Coding references from students for direct instruction for both Case A and Case B show the greatest differential between students and teachers. This reflects the instructional design element of giving students agency to contribute to the emergent course content. The course requirement of showing their learning in their semi-public journals results in students exhibiting the direct instruction indicators of presenting content and injecting knowledge from diverse sources to accomplish their learning outcomes. Students know that in a course where summative evaluation is limited to an overview of their activity over the time span of the course, they will receive support and correction from other participants on the site if they are on the wrong track or unable to resolve problems.

The dominance of direct instruction coding references was supported by the results for taxonomy of discussion indicators (Booth & Hultén, 2003) for which factual indicators presented the greatest number of coding references. Value creation indicators (Wenger et al., 2011) also supported these results, in which knowledge capital and in particular tangible capital, had the highest number of coding indicators for this framework. Tangible capital refers to resources such as “information, documents, tools, and procedures,” as well as “links and references . . . that facilitate access to information” (Wenger et al. 2011, p. 20). The significance of this indicator will be discussed in greater detail below. Its importance here, combined with the high number of factual indicators, is to add rigor to the finding that teaching presence is represented primarily by direct instruction indicators and to illustrate that the posting of factual information is the largest activity on these sites.

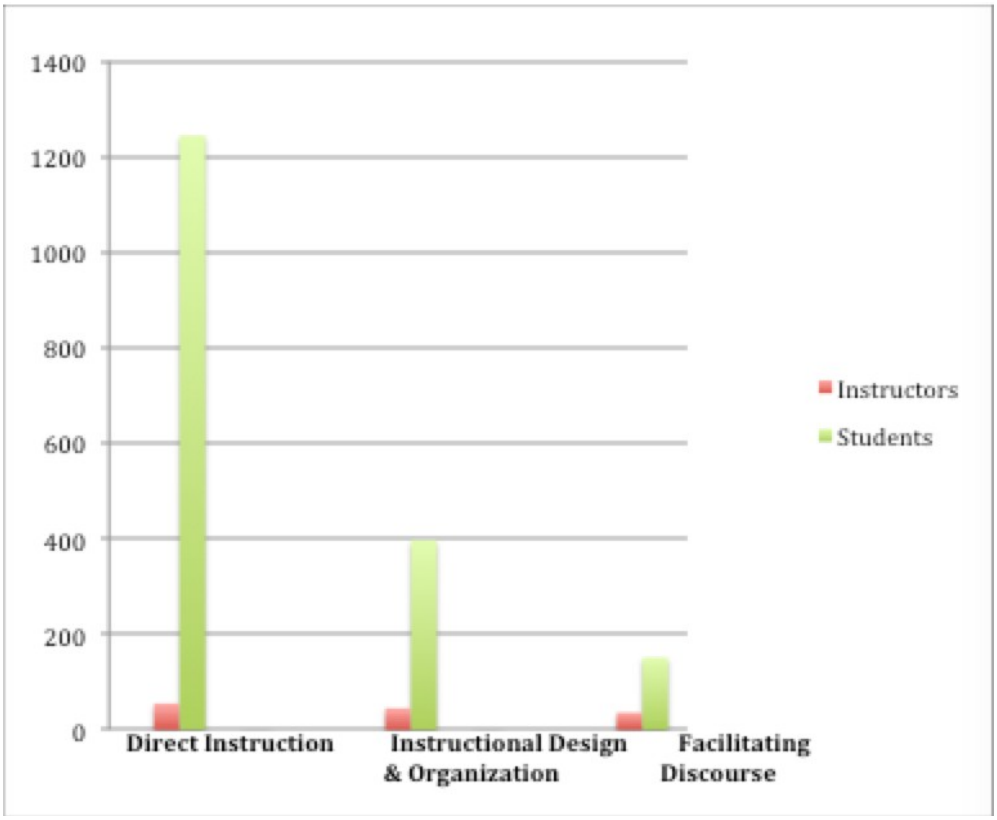


Figure 11. Case A posts - comparison of instructor posts to student posts.

While this finding may seem to indicate superficial learning activity – the collection of facts, URLs, and procedures – in the context of a community of inquiry, Garrison and Archer (2000, p. 53) argue that factual knowledge is a necessary component for discourse. They caution that "discourse must focus upon problems of explanation and understanding". While academic discussion centered on extending comprehension is very limited in posts in both cases, students use their learning journals as a monologue in which they explain their thinking and procedures. In the journals, direct instruction indicators of presenting content, injecting knowledge from diverse sources and confirming understanding through assessment and explanatory feedback formulate a discourse. Reasoning and explaining in journal entries "carries the individual beyond personal meaning and isolation," (Garrison & Archer, 2000, p. 53). The learning activity of writing and posting learning journals combined with the agency students have to create their own product and find (and share) their own resources creates an environment in which students are motivated to create authentic meaning.

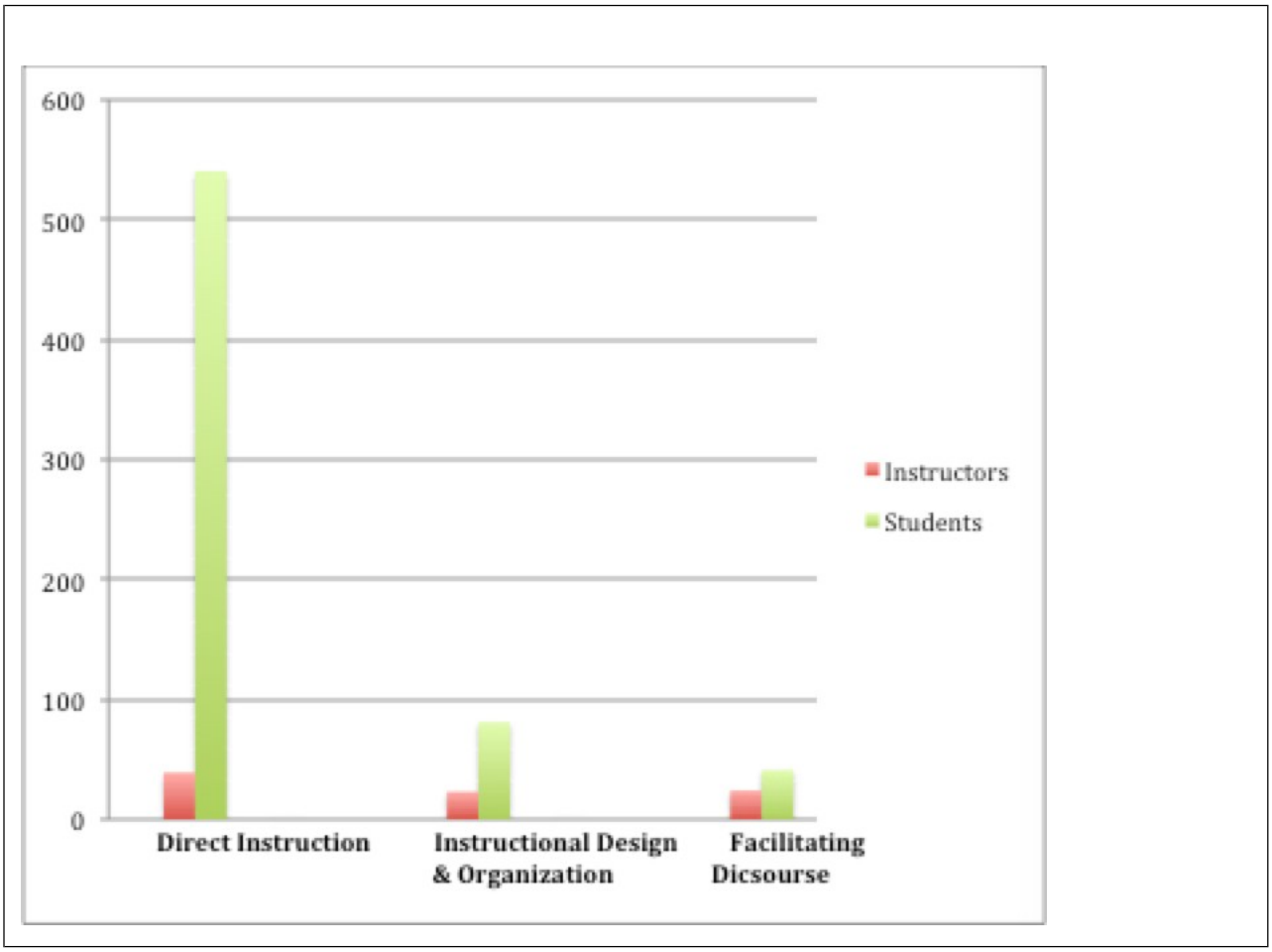


Figure 12. Case B posts - comparison of instructor posts to student posts.

By posting their journals on the course site, students take their micro-design and make it a component of the macro-design of the course. At the macro level, the course creators make it clear to the students that they need to use their learning journal as a demonstration of their learning. These actions combined with comments, often in the welcome post to students beginning the course, communicate the features of student agency designed to support learning with the instructor and other students. The actions also communicate the sites' flat architecture where transparent learning actions are more important than hierarchical position and privilege, another characteristic of constructionist learning.

Facilitating discourse exhibits differing indicator profiles. Case A exhibited coding references for encouraging, acknowledging or reinforcing student contributions and setting a climate for learning made up over 50% of the total coding references in this category. In Case B

setting a climate for learning and encouraging, acknowledging or reinforcing student contributions accounted for 60% of the coding references. The majority of coding references for both cases were made by students with the exception of encouraging, acknowledging or reinforcing student contributions in Case B. The instructor's personal style may account for his comparatively large number of responses to student contributions. The pattern of students making the majority of the references reinforces the concept of student agency with which to create their learning experiences.

The coding references for teaching presence indicators as a whole reveal a learning experience where the instructional design of both Cases A and B give students the power to construct their learning through discovering the tools and techniques they need to complete their programming. They then move their experience from the collection of facts to the creation of meaning through the completion of learning journals that require the students to record and reflect on their learning in a constructivist manner.

Value creation indicators and value creation stories. The third research question addresses the value teaching presence offers students and staff at Athabasca University. Wenger et al.'s (2011) value creation indicators are designed to measure learning value in communities and networks. Posts were coded for three of the five cycles in the framework: activity and interactions, knowledge capital, and changes in practice. The last two cycles: performance improvement and redefining success were beyond the scope of this investigation.

Coding references for knowledge capital represented the greatest number of references in both Case A and B. Activity and interactions in both cases made up the next greatest number of references while changes in practice resulted in a small number of coding references.

Knowledge capital, the largest category, consists of human capital, social capital, tangible capital, reputational capital, which was not coded being beyond the study scope, and learning capital. Of these indicators, tangible capital showed the greatest number of coding references. This supports the findings in the teaching presence indicators which showed direct instruction indicators as the largest group of references.

Tangible capital, a form of knowledge capital, includes information, tools, and procedures – content which mirrors direct instruction indicators. From this, it appears that value for the course sites lies in content that can be used for programming. However, these findings

need to be situated within the context of the course sites.

Both sites use learning journals to prompt reflection and to promote collaboration between the student and the instructor. Garrison and Archer (2000, p. 35) cite experience and reflection as change agents. They add that collaboration allows for a climate wherein the student is responsible for her own learning and the teacher facilitates rather than prescribes. The course design prompts experience through programming and reflection through journaling. Experience combined with the reflection necessary for journaling prompt change and through change, learning. The role of cooperation in these courses suggests that Garrison and Archer's (2000) statement could be expanded to include cooperation as well as collaboration.

Taxonomy of discussion indicators. The second research question concerns discussion promoting learning in these self-paced courses. The taxonomy of discussion indicators consists of participatory indicators, factual indicators, reflective contributions, and learning contributions identifying the progression that Booth and Hultén (2003) propose make up the learning experience of moving from the collection of facts to reflection. The results for Cases A and B differ more for the taxonomy indicators than those for teaching presence indicators.

The coding references for the taxonomy of discussion indicators support the findings of teaching presence indicators of direct instruction being the predominant category coded. The Landing allows for posts showing participatory indicators and factual indicators within student posts. Participatory indicators refer to a person or the person's post, self-identify, name a person, request and ask for information and acknowledge an earlier statement by name while factual indicators consist of presentations, proposals, eventual solutions and requests for facts related to the problem.

Participatory indicators. In both Cases A and B, the large majority of the coding references identified participatory and factual indicators. In Case A these indicators represented 95% of the coding references. The educational group aspects of both sites allow actions that are referenced as participatory indicators. Participants are able to greet other participants, identify themselves, both in introductory posts and in the use of the traditional letter writing convention of signing their name at the end of a post and address participants by name.

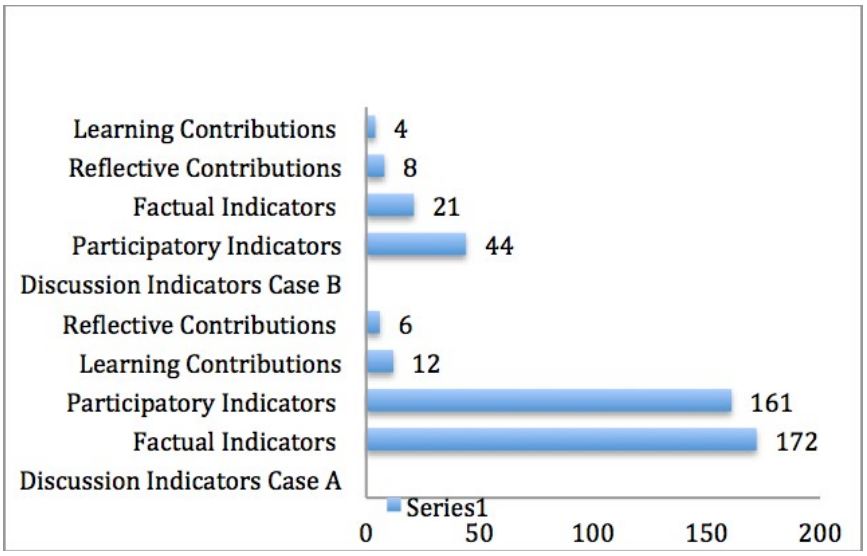


Figure 13. Taxonomy of discussion indicators for Cases A and B.

Factual indicators. Factual indicators formed almost half of the coding references in Case A. This reflects the course design that has students publish their project proposals, presentations of their thinking and coding designs. Students share URLs and websites that they found useful. This resulted in many posts that are paragraphs of explanation detailing student intentions or work accomplished while others consist only of a URL with or without explanation.

There were fewer factual indicators in Case B (just over a quarter of the posts coded as references to taxonomy indicators). This again seems to be due to course design. Participants in this course do not have the requirement of posting a complex proposal but were required to show that they had collaborated with other students. Consequently, there were posts adding websites and URLs as well as posts adding information regarding the physics involved in programming the robots. As with Case A, students reported that these posts allowed them to move their learning ahead.

Students in Case B embedded diagrams, photos, and video of their projects as well as links to their YouTube channels giving both assessors, students, and the public access to demonstrations of their learning. The ability to embed this access allows students to demonstrate their progress toward solving design challenges and adds the possibility of extending their network beyond the course site. Access to the videos on YouTube also has the potential to increase the university's reputational capital by making its courses more visible to the general public.

Reflective contributions. Reflective contributions: substantiating agreement or disagreement with other statements and questioning what was said formed smaller percentages of the total coding references in both cases.

In Case B, the two coding references to questioning what was said illustrate significant aspects of certain taxonomy of discussion indicators and teaching presence indicators. One post elicited opinions about the course text. It suggested that the text was inadequate and asked for suggestions for a more appropriate text. This post led to a fairly long exchange which ended when the course creator moved from telling students that he would revise the course to giving students agency to contribute to a WIKI detailing changes that could be made to improve the course.

The second post questioned the learning outcome requiring students to show collaboration. The student cited various reasons why collaboration was not appropriate and then admitted that he understood why collaboration was required and admitted that although he had not received comments directed to him, he had read "over 30 other students wikis . . . to help get my juices flowing and think a little outside the box". C2-S6 In questioning the collaborative requirement for the course, he came to realize that collaboration had supported his learning.

There were very few reflective contributions in Case A. The few posts that questioned what was said referred to the usefulness of websites or course materials. These comments did reflect the students' confidence in their knowledge. The posts substantiating agreement or disagreement with other statements were both student contributions explaining their reasoning behind using an alternative resource to the resource used by most students. Again, students demonstrated their sense of ownership for their learning.

In Case B, there were more statements justifying agreement or disagreement with other statements. One of the posts was from the course instructor in a series of posts he exchanged with another instructor. This post allowed students the opportunity to observe a professional exchange in which the participants disagree in a respectful, academic manner. The exchange modelled teaching behavior although this behavior is not reflected in the teaching presence indicators. Other coding references substantiated using precise language to describe robotic design and actions. It should be noted that although in Case A, interactions are referred to as cooperative, in Case B, the same action is referred to as collaborative. Cooperative is the more

accurate term. This will be discussed in greater detail in the next section.

Learning contributions. Statements that show learners are open to new possibilities include the reference above to the student's realization that collaboration had supported his learning. Other statements in Case B that reflect learning contributions include learning about ordering and testing materials for constructing the robots and learning about course requirements and the line between collaboration and cheating.

In Case A learning references included mention of learning about website features, methodologies for the creation of websites and the need for compatibility across platforms. There is evidence that the Landing affordance of a multi-platform environment allows participants to take their learning beyond the collection of facts. It may be that the unique combination of environments allows students to use this platform in a non-traditional manner that advantages a cooperative approach wherein students learn from each other and the instructor's largest role is to maintain the course design and to encourage students.

Resources affecting success. The third sub-question investigates how participation on the Landing helps create a resource or resources that affect individual success and/or success for the organization. The measure used for this investigation is Wenger, Trayner, and de Laat's (2011) value creation assessment framework. This framework uses the tension between value creation cycles and value creation stories to identify the learning value provided by participation in the community or network. The nature of actions in networks and communities can be identified by categorizing actions according to the cycles of Wenger et al.'s (2011) conceptual framework. When this information is combined with the information provided by story-tellers in value creation stories, a picture of the learning value various actions affords the individual and the organization comes into focus and allows participants to make judgments about the learning value of their efforts.

Capital. Within the cycle of knowledge capital, the indicator tangible capital which takes the form of access to information, tools, strategies, and networked information, has the greatest number of coding references. These coding references appeared in posts in learning journals which remain on the site after the participants' activity is finished. Tangible capital formation in both courses empowers students to be in charge of their own learning and serves to keep the information about a constantly developing knowledge base current and useful.

Human capital which takes the form of useful skills, key pieces of information or new perspectives also received a large number of coding references. Both students and one instructor reported receiving key pieces of information and developing new perspectives through their interactions with others on the course sites.

Social capital or knowing who to ask for information forms the basis of networked interactions on the course sites. A small number of coding references reflect this form of capital as a component of interactions on the course sites. Social capital is not a major factor in these courses. The self-paced nature of the course means that students do not share sufficient course time to form the relationships necessary for sustained networked interactions. As mentioned above, interactions are generally brief exchanges.

Learning capital, a transformed ability to learn, made up a small number of coding references. Students discussed the utility of various learning strategies built into the course design and described learning processes they had "discovered". This may be due to students' lack of ability to recognize metacognitive actions.

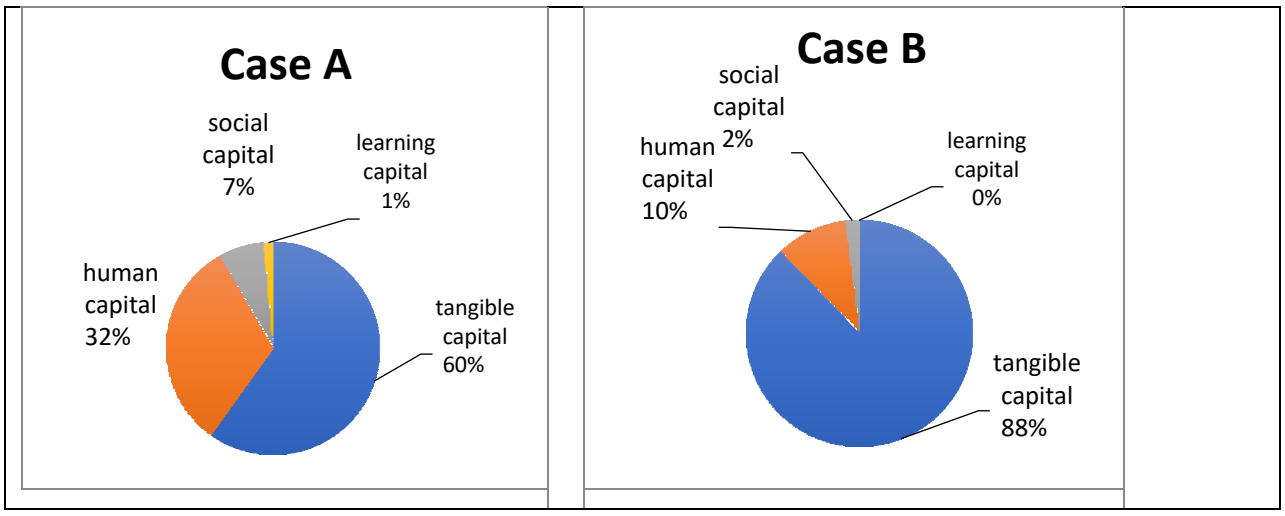


Figure 14. Knowledge capital indicators for Cases A and B.

Activity and interaction. Learning value for activity and interactions is the result of transactions between participants in the course sites. Giving input and passing on information reflect the results for the teaching presence indicators and the taxonomy of discussion indicators. The major indicators for this category suggest impersonal contributions to the course site, reinforcing the set like characteristics of much of the interaction in the courses.

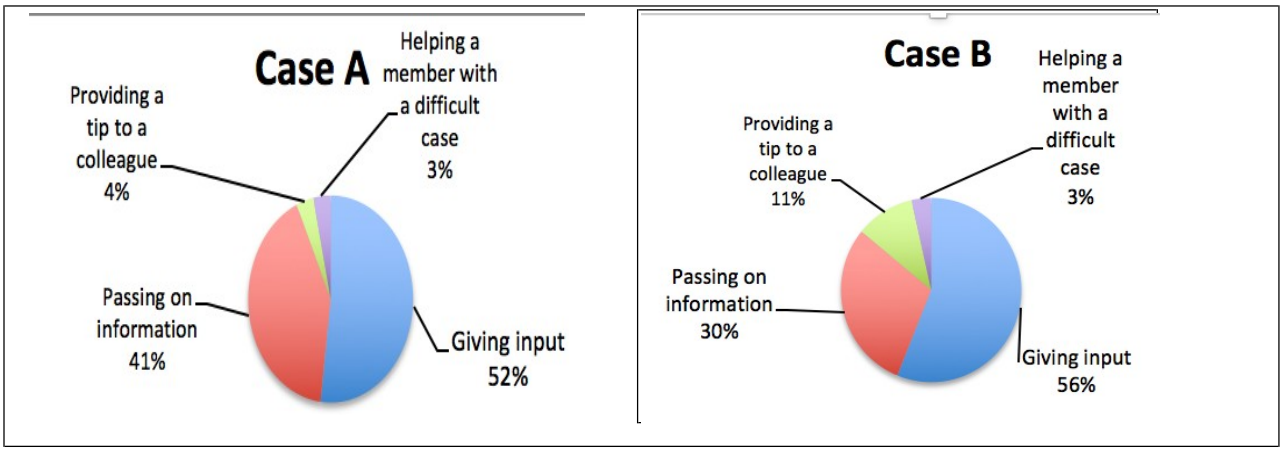


Figure 15. Activity and interaction indicators for Cases A and B.

Changes in practice. Changes in practice are shown in changes in design for both web programming and robotic programming as well as changes in construction design for the robots. They are often prompted by the feedback provided by their design in the form of substandard performance. In these cases, students were able to diagnose the problem and make a correction to gain the performance they wanted from their programming. In cases where they were not able to find the problem, they were able to appeal to others for help in a post or make use of previous students' learning journals to solve their problem.

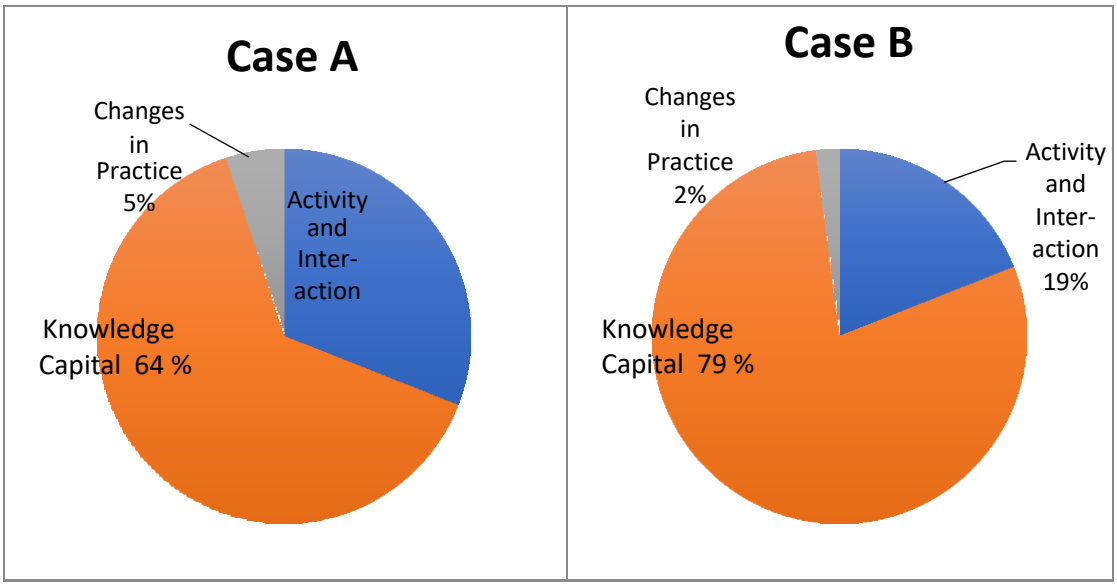


Figure 16. Value creation indicators for Cases A and B.

Value creation stories. The value creation stories addressed five areas of activity which correspond to the value creation cycles described above. The categories the participants addressed were activity, output, application, outcome, and new definition of success. Appendix C details the questions used as guidelines for the story-tellers. While the sample size for this part of the analysis is small (four participants), the information is rich. In order to comply with the requirements of the Ethics Approval, invitations to participate in the study needed to be sent through the University's Information Architect. There was no opportunity for direct contact with the course participants to answer any questions potential participants may have had and invitations were sent out months after participants finished their course work.

The value creation stories provide an opportunity to add personal experience to the data gathered by examining participant actions in light of the five value creation cycles. The questions in the story-telling template correspond to the value creation cycle and in putting a human face on the data, add an affective element to the framework.

Activity. When reporting meaningful activity in the course sites, all participants related transactions with other participants as significant. The instructor summarized the transactions in Case A as cooperative behaviors (as opposed to collaborative behaviors) in the form of short exchanges. More specifically, participants mentioned advice taken and passed on, questions

regarding the value of the course text and discussion of necessary background skills, and communication from the instructor regarding course activities that could be accessed at the participant's convenience. The actions indicate that participants valued transactional activity in the course.

Output. The second prompt of the value creation story template asked participants to describe a specific resource the activity produced. Not surprisingly, one participant mentioned marks as a resource produced in addition to meaningful interaction. The course instructor in Case A talked about "ripples of inspiration" that resulted in students developing their own perspective. This was supported by a student perception that resources being readily available helped to deepen his understanding of the material. Another student related that the resource produced from a discussion of the value of the course text was interaction with the course coordinator who encouraged participants to post their challenges with the course. He believed that this encouraged others to post resources they found useful in overcoming challenges they found in the course.

Application. The third prompt concerned how respondents used the resource and what it allowed them to do that they would not have been able to do without the resource. The course coordinator described an infection model of learning where a post from one participant prompted learning in another participant. This action was echoed in the response of two other respondents who reported using code and passing it on and posting links so that others could use them. The fourth respondent spoke of how his use of the site unified his experience by having resources in one site rather than distributed over several sites. This seemed to give the student a sense of place.

Outcome. This prompt has two parts. The first part concerns personal benefit and asks respondents to explain how the resource affected personal success. Each of the students reported improved grades as a personal outcome. A sense of teamwork and community resulting from interactions with others as well as recognition of a support system were outcomes for two of the students. The third student spoke of the flexibility of time and the convenience of accessing course material and resources anywhere as being a valuable outcome despite this actually enabling an outcome. The course coordinator found value in constantly refining his learning.

The second part of the question concerns the learning value participants find for the organization – in this case Athabasca University in the resources found on the Landing course

sites. Two of the students were unsure of the value for the organization. The third student stated: "Every contribution to the landing provides original content that the other students can read and use". C2-S2 This response alludes to the course site on the Landing as being a repository for learning (actionable knowledge) residing in non-human appliances. The course coordinator in Case A spoke of his having learned that welcoming students as quickly as possible after their initial post increases the "chances of continued positive engagement" in the course. Both of these responses indicate learning value for the university.

New definition of success. This question addressed changes in how participants define success. One respondent was unsure. Another stated that participation in the course had reinforced the idea that success "can be as simple as working together with a co-worker to promote a shared interest". C1-S10 A third participant reported that the experience had reconfirmed his belief that flexible learning environments were best for him. The course coordinator reiterated the importance of responding quickly to students' initial posts to compensate for the lack of "ritual of place" in online learning.

Groups, nets, and sets. Conrad (2014, p. 384) points out, that research in online teaching and learning has begun to focus on the "affective, social landscape". Just as course design prompts learning through experience and reflection, it also provides the environments in which learning takes place. As Dron and Anderson (2015, p. 49) explain "the environment places constraints on our thinking . . . or influences us to think and behave in certain ways . . . Objects and spaces are participants in the cognitive process". The first sub question, further exploring the evidence of teaching presence on the Landing is: how is teaching presence evident in groups, nets, and sets on the Landing if at all. This aspect of the investigation exposes the intersection of the indicators and the environment in which they are situated.

Dron and Anderson's (2015, p. 98) rules of thumb were used to identify groups which persist even without participants, nets if people are identifiable and recognized by others in the network and sets where the topic (the set of things of interest to this aggregation) is of importance and individuals' identities are inconsequential. Admittedly, these are the beginning of developing a robust typology for identifying these environments. Groups were identified most often as the environment in which activity took place in both Case A and Case B. This is

the environment most often associated with formal education. It allows for the communication of content and its closed nature provides safety to explore new perspectives and to share one's ideas through course activities. Coupled with the design feature of learning journals, it provides space for a repository of knowledge, a sort of organizational memory that extends beyond any one participants' activity in the course. To use a room analogy, groups are like a living room. They are generally comfortable places where everyone knows the rules of conduct and behaves accordingly.

Nets or network activity received the least coding references of the three environments. The nature of self-paced, continuous enrollment courses hinders the development of the relationships necessary for networks to develop. Despite students being made aware that they continue to be members of the closed group after they have completed the course

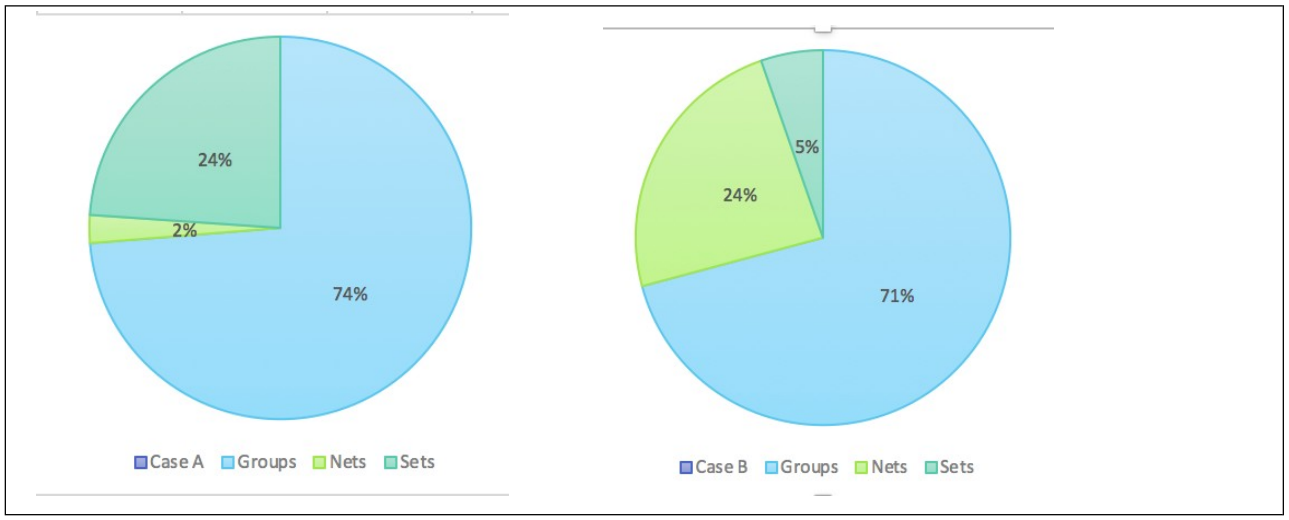


Figure 17. Social forms in Cases A and B.

requirements, there is no evidence of active participation (in the form of posts) beyond the time required to complete their coursework. It is possible that participants return to the site to read others' posts, but this is difficult activity to track. Nevertheless, it seems that despite the lack of recognition of specific people in posts, the activity is networked based suggesting that students consider other participants in the same way they recognize specific individuals in other networks.

Students are able to use a picture to identify themselves. They have the choice of using a default icon or uploading a photograph or drawing allowing students to choose their degree of visibility. This is reminiscent of social media environments such as Facebook or Instagram or

professional sites such as LinkedIn. Due to the privacy controls allowed students, they can control their degree of visibility ranging from invisible with the use of a default icon to drawings, to photos, and photos doctored to alter the participant's persona.

In Case B, student use of YouTube as the platform to display work, increased the potential for network growth by the number of people who viewed the video. YouTube affords a convenient means for students to display their work, by passing the sometimes slow Landing site and adds reputational capital to both students and the university.

The net environment can be compared to a reception room in which people congregate and communicate with people they know, only occasionally venturing out to introduce themselves to someone with whom they previously had not had connection.

Set characteristics - an interest in programming – either web programming in the Case A or robotic programming in Case B prompted students to register in these courses. The set format allows information to be posted both as proof of fulfilling learning outcomes for individual students and for others' use. It also allows information to be posted (and retrieved) from diverse sources in a very brief format that keeps it from becoming lost in a sea of words. Information regarding websites and programming strategies can be kept current as participants advise others of its status. Another telling characteristic of set activity is the use of shortened names and occasionally pseudonyms to identify participants. Several students used only their first names; one student used initials; and one student added qualifiers to her name, for example: "The Nerdy Baking Jock". The formality found in traditional educational groups with regards to names is not always evident in Case A although students in Case B did use their traditional names. In fact, academic writing style was not a concern in either case. Students expressed themselves in short exchanges that resembled spoken language. This may have been due to the set characteristics of a first-year course versus a third-year course and the maturity of the students each set includes. The intersection of learning actions and set characteristics is an aspect of learning that will be more accessible when set characteristics are more clearly defined.

To continue the room analogy, the set aspects of the environment resemble a lecture hall where people are in attendance for the subject matter and for the most part ignore the identities of other participants. The three environments that make up the course sites on the Landing form an environment that extends the traditional educational group environment of asynchronous computer mediated conferences. While one of the course creators and some students commented

on the confusion that multiple environments can cause when there is no obvious demarcation between spaces, it does allow participants to use the social form that best suits their purpose and personality.

In proposing a new e-learning model, groups, nets, and sets revealed new facets. Originally, they were coded using Dron and Anderson's (2014) rules of thumb. Due to the nature of the instructional design, each course was both an educational group and a set. Nets were the means by which information was transmitted – literally – information highways and were the groundwork for direct instruction. Due to the course designs wherein groups and sets were overlapping and nets were ubiquitous, Dron and Anderson's rules of thumb lost relevance.

The course design suggests that various approaches could more appropriately investigate the existence of these social forms. A more informative approach to investigate nets would have been to examine the interactions of each participant to track the networks each developed and used. Educational groups have distinct characteristics that did can be used for coding the effects the characteristics have on students. For example, the group characteristic of a specific start and finish date, which in this course did not affect the group at the same time, did have the effect for some students of rushing and submitting work that they considered incomplete or substandard. For sets, using the vocabulary that pertains to each subject area could indicate how deeply involved the various participants were in each area of endeavor and through this indicate the student's grasp and understanding of the subject matter. A caution here, though, is to be aware of the rare student who adopts the language of a set in an effort to appear to belong without the background knowledge that other members of the set have gained. As mentioned above, the intent of identifying groups, nets, and sets as social formats within the courses was to open discussion and research into the nature of these forms and their effect on student learning. Further research could focus on the results these forms produce for learners.

Chapter 7. Discussion and Concluding Remarks

Discussion

This discussion addresses the differences in the findings for these courses and the courses previously studied using the teaching presence indicators by situating the above findings in the literature. The chapter closes with implications for practice, and for further research.

This investigation of teaching presence in self-paced courses partially offered on the Landing, reveals several significant differences from previous studies of teaching presence in computer mediated learning environments. With direct instruction the predominant teaching presence indicator, instructional design and organization the second most coded indicator and facilitating discussion accounting for 13% of the total posts in Case A and 12% in Case B (See Figure 10), and the vast majority of these posts made by students (See Figure 11), the findings reveal a very different picture of teaching presence. The strength of the direct instruction indicators is supported by knowledge capital indicators (Wenger et al., 2011) coded and factual indicators (Booth & Hultén, 2003) coding. This finding begs the question of what prompts the difference.

In order to facilitate the discussion of this very rich, complex learning environment, Figure 18 illustrates the influences from which course designs in both cases draw. The discussion begins with e-learning design principles developed by Dron (2007). Networked learning's contribution to teaching presence in these courses follows. Connectivism and heutagogical principles will be discussed next and the elements of community of practice and cooperative learning that contribute to teaching presence complete this part of the discussion.

Instructional design and organization, an element that has been deemed a pre-course activity (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson & Swan, 2008) is evident both in participants' actions through their time in the course and using Wenger et al.'s (2011) concept of proxy, attributable to the course creators. Direct instruction in the course exemplifies heutagogical methods communicated in a dialogue format. The choices made by course creators which allow self-directed learning are the subject of the following paragraphs.

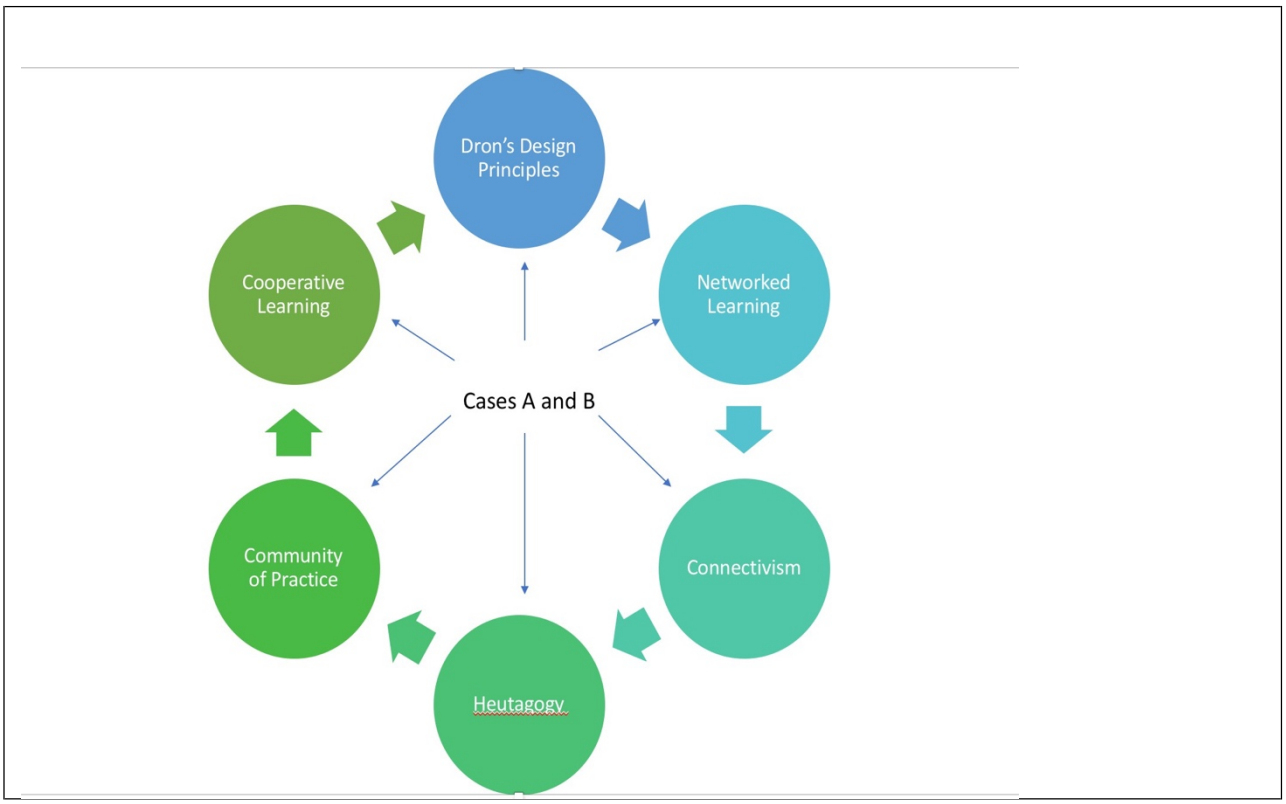


Figure 18. The primary frameworks and pedagogies included in the course design mashup.

Dron's principles of design (2007), discussed above (see pp 31, 32) propose design for utility rather than beauty so that the structure can be changed to fit its purpose, allowing course creators to take advantage of the most appropriate features of several pedagogies and frameworks. Unlike Moodle sites, the main course page has nooks which when opened reveal various aspects of the course: participant profiles, group discussion pages, blogs, and wikis for example. This mélange of aspects of social media position the student for the learning experience to follow.

In order to accommodate many uses and users, courses require flexibility and adaptability to the needs of the students. The use of a modular design, in this case one based on an Elgg platform, allows for quick changes in the course site such as the one the course teacher in Case B made to give student input into the design of the course. While students were given the ability to co-create aspects of the course with the teacher, they were also given the message that their input

was of equal value to that of teacher. This message was given to students active on the course site when the teacher made his decision, but it also left a subtle sign to subsequent students reading through posts that student input is valued and worthy of consideration.

Stigmergic traces such as the one left in Case B, are sign-based in that the original sign – the wiki to hold suggestions to improve the course – will not likely be repeated. The form it leaves behind – the message that student input is valued and acted upon, will persist for an indefinite period of time. A second type of stigmergic trace – sematectonic signs are the forms they prompt. So dialogic forms of communication, the use of URLs and websites that are deemed helpful, what have previously been termed informal communication structures and conventions from social media such as the @ sign to indicate a message directed at a specific person are all forms of sematectonic signs. Once used, they remain in use due to the message to new participants that this behavior is acceptable. These sematectonic signals will remain in use until they are no longer useful, and a more current form takes their place.

Both of these forms of stigmergy encourage self-organizing behavior with the result that structure is formed through dialogue (Dron, 2007, p. 254). Small stigmergic signs allow the behavior of current students in the course to set standards which influence the behavior of subsequent students. Students in both Cases A and B tacitly understand that they receive information through dialogue rather than discussion, that they are able to use information left by other students to enhance their own work, and that they are encouraged to share valuable information they have found with other students. Although the behaviors are subtle, they change the structure the learning students experience and these changes remain within the course structure.

One characteristic of stigmergic traces is the tendency to become stronger without countervailing influences. The Matthew principle of the rich getting richer, here, refers to very active participants becoming unduly influential. One of the characteristics of self-paced courses acts as a constraint on this principle. Students generally complete the course as quickly as they are able in the interest of moving on to the next phase of their studies. This reality limits the influence of any single individual so that no one person becomes dominant. Useful URLs, websites, and tutorials live on in students' learning diaries and journals even as the people themselves move on.

Other principles for social software in e-learning are parcellate, speciate, and scale. Again, using a principle borrowed from evolutionary theory, Dron suggests that niches, where diversity can grow, are useful to each of these principles. There is parcellation to some extent in the learning diaries and journals that each student submits as proof of learning. The diaries and journals record design variations and construction techniques that students found useful in their learning and are housed in these niche spaces so that students looking for a different way of accomplishing a learning goal can make use of them. In this way, variations on strategies and techniques are developed and transmitted to subsequent students.

Speciation is needed to allow for change to occur and if successful, to be reproduced and become part of the system. A small example from both Cases A and B is the use of the @ symbol to indicate that a comment is addressed to a specific person. This technique, taken from social media is a departure from the more formal style found in many computer mediated discussions which are usually closely aligned with APA style. The adoption of this symbol is effective in two ways. It stands out from the text and allows participants to distinguish a post addressing a particular participant from general contributions. While it is a small change, it signals a move toward the use of current communication strategies which are usually banned from formal courses in favor of traditional academic discourse. This change emphasizes the learner-centered orientation of courses in which students have agency to contribute to the design of their learning environment.

The design affordances of parcellation and speciation illustrate the power of scale in this particular course design. Officially, each of the courses (or the content of the courses) investigated were housed in Moodle. The course sites on the Landing, however, are the workplaces where design learning happen. A design that creates niche spaces apart from the learning management system favors parcellation which allows the creative use of learning spaces and thus encourages speciation. The changes brought about through speciation have played a role in sustaining dialogue-based rather than discussion-based communication, where students teach each other, with the instructor acting as an enlightened friend who encourages and occasionally redirects students who need guidance. The scale of the course sites, smaller and softer than a formal LMS site, allows for quick changes in response to student needs and echoes Dron's first principle of building for utility rather than beauty.

These aspects of the design of the courses on the Landing act as a system (Moore, 1993, and Seely Brown & Duguid, 2000). As with all systems, the components are interdependent so a change in one part means a change to the whole. Returning to the example of the creation of a wiki in Case B, the change not only gave the instructor insight into what students wanted in the course but gave students agency to act as co-creators of their learning experience. In this way, the system becomes more open and the design more distributed as students moved from designing their particular learning to participating in the design of the learning system for all course participants.

This example also illustrates aspects of Dron's sixth principle of building from the bottom up and designing from the top down. As students built their personal learning experience, several felt free to discuss the overall design of the course, specifically, the choice of text, in open dialogue. As comments increased, the instructor, because of the design of this part of the course site, was able to add a niche space to the course design to allow for student input. This happened within hours of the beginning of the discussion and illustrates the capacity this site has to respond to participants' needs. A change such as this would have been a major course redesign in a Moodle environment.

Dron's last principles for social software in e-learning address trustworthiness and sociability. An evaluation of the trustworthiness of the entire Landing site is beyond the scope of this investigation. There are several measures designed into both courses to address trustworthiness for students. Each course is a closed group, so that membership is controlled by the course owner (usually the instructor). Students are able to control the audience for their work and comments from a level only accessible by the person herself to accessibility for the entire group or even anyone on the Landing. This ability is related to freedoms of relationship and disclosure which are discussed below.

Dron acknowledges the need for a knowledge authority to prevent the spread of misinformation. This relates to the direct instruction teaching presence indicator of presenting content for consideration. With the vast majority of posts coded as direct instruction coming from students, this could be a difficulty but for two factors. The focus of these courses – computer programming – provides direct formative assessment as to the accuracy of the information used in the programming context. In other words, if the code used is wrong, the artifact will not perform as expected and the student will know immediately. The second factor

concerns the stigmergic traces left in the learning diaries, journals, and posts on the site. The more often a URL, a website, or tutorial is mentioned or recommended, the more its veracity increases. While repetition does not always assure authenticity, the report of its successful use provides assurance of its worth.

One aspect of the course is less trustworthy than desirable. The site's reliability is a source of frustration for students in that they often had to wait for their posts to appear on the site. Due to the lack of indication that the site is uploading, students occasionally uploaded their post two or even three times.

Sociability is Dron's last principle for design and the most difficult to pre-plan. The level of sociability of a site is based on its users and given that the users build the site through dialogue, sociability cannot be implemented before the system is in use. Instructors in both courses, however, did encourage sociability with welcoming posts soon after students posted their personal information pages, and in this way, set a tone for behavior on the site. Although interaction was generally limited to short exchanges, participants were open and friendly and both sites had the atmosphere of cooperative friendly co-workers who while acknowledging the presence of others and their help when offered, were focused on their tasks and more eager to work on them than pass the time of day. Both the teachers' welcomes and the students' focus on work while taking time to help others set a climate for learning on each of the sites, a teaching presence indicator that is difficult to identify.

Participant exchanges form the basis for a very fluid network in each of the course sites. Networked learning which uses information and communications technology (ICT) to promote connections is the crux of the learning environment in these courses. Seely Brown and Duguid (2000, p. 169) describe learning ecologies as "informal links running along networks of practice that allow knowledge to flow to where, from an ecological perspective, it belongs". The networks in these courses are very fluid due to the self-paced nature of the courses and allow student to be the major contributors of knowledge in each of the cases. Both courses are rich in learner to learner interaction which forms the bulk of direct instruction, particularly, presenting content and questions for consideration, injecting knowledge from diverse sources and confirming understanding through assessment and feedback.

As discussed above, the majority of the feedback and assessment was formative and was delivered through the operability of each participant's programming design. Injecting knowledge

and presenting content and questions for consideration were conveyed in brief dialogues between students and occasionally through student to tutor/teacher interactions. Interactions between the learning community and learning resources were evident in injections of knowledge, presentations of content since the learning resources for Case A were web-based, as were many of the learning resources in Case B which also used a textbook to guide student learning. One robust learning resource in both Case A and Case B were the learning diaries and journals. Various students reported using the diaries and journals as a resource to either come to an understanding of the course structure and expectations, or to find web-based resources that other students had used successfully. Networks in both courses form the basis of student interactions and dialogue and although very fluid, formed the basis for participant connection.

The mashup design also makes use of principles of connectivism. Six of the eight principles enumerated by Siemens (2004) can be directly related to learning in these courses. While Siemens states that "Learning and knowledge rest in a diversity of opinions", it could be argued that learning and knowledge in these courses is fact and experienced based rather than opinion based. Nevertheless, learning and knowledge do rest in the diversity of learning shared by the participants. Students in both courses learn through connecting specialized nodes or information sources, some of which rest in non-human appliances, given the definition of learning as actionable knowledge. This learning is recorded in each student's learning diary or journal and is available to all students to use in their programming design. Student ability to see the connections between various fields, ideas, and concepts is necessary for students to successfully complete their design as they search the multitude of websites and tutorials available to support their programming. While endeavoring to use the most up-to-date knowledge, students must go through decision making processes for each piece of information to ascertain that which will be most helpful in completing their task.

Siemens implies that non-human appliances are digital artifacts, but is not explicit in his definition and this leaves open the opportunity to extend the term non-human appliances to any artifact that contains actionable knowledge which Siemens terms learning. His use of the term non-human appliance is problematic in that appliances by definition are non-human (appliance, n.d.). The term digital appliances would limit his discussion to the digital. The learning diaries and journals by virtue of their residence on the course sites are digital artifacts and so can be termed non-human appliances in accordance with Siemens' proposal.

These principles are associated with several teaching presence indicators. In the category of instructional design and organization, designing methods is related to seeing connections between fields, currency and decision-making. Utilizing the medium effectively is connected to the principle of nurturing and maintaining connections to facilitate continual learning and identifying areas of agreement or disagreement is part of the process of decision-making, although disagreements were rarely expressed.

Direct instruction is the category with the most connections to Siemen's principles. Presenting content and questions for consideration and injecting knowledge from diverse sources both illustrate the principle of learning and knowledge resting in diversity as well as learning being a process of connecting specialized nodes or information sources. These indicators also illustrate that learning (as actionable knowledge) may reside in non-human appliances. The content and knowledge that students present is recorded in learning journals or diaries which are available to all participants for use in their learning. Diagnosing misperceptions was generally done by the person who misunderstood as a result of programming attempts that did not perform as expected. This teaching presence indicator shows decision-making as a learning process and was initiated by students rather than teachers. This indicator is related to freedom of delegation, one of the decagon of freedoms explicated by Dron and Anderson (2014) and discussed in greater detail below. The majority of the teaching presence indicators identified in posts were related to connectivist principles, indicating the strong connectivist basis for the design of these learning environments.

As well as networked learning being a basis for learning in these courses, students' interactions with each other show characteristics of heutagogical design. This orientation is a point where heutagogy intersects with connectivist learning.

A heutagogical approach is evident in each of the courses studied in this investigation. Each of the courses can be changed very quickly in response to student needs and the broad course objectives allow students to design the details of their learning to suit their own particular situation. Students have already identified a learning need by virtue of their enrollment in the course and are involved further while designing the specific requirements for their computer programming and how they will go about meeting those needs. In this way, students are co-creators of the curriculum which leads to their learning. The process of developing their learning diaries or journals which are based on their personal learning experience in the course leads

students from competency, which Hase and Kenyon (2007) define as knowledge and skills centered around known contexts toward capability which allows for competent responses to new situations. In these courses, students use their prior knowledge of programming to build new knowledge and that competency to solve problems in a new context. Should students experience difficulty in new contexts, the formal teacher and more often in these courses, peers are willing to coach the student to find a solution. The emphasis on knowledge sharing and the future orientation in terms of problem solving echo elements of connectivist theory.

In terms of teaching presence, Hase and Kenyon's (2007) principles address indicators for instructional design and organization in the setting of curricular details and designing learning methods. Although not accomplished through discussion, a heutagogical approach sets a climate for learning that is distinctly different from traditional learning environments and allows students to continuously assess the efficacy of their learning process (a facilitating discussion indicator in teaching presence). The recognition of the need to design for a flexible curriculum that changes with learner needs is actualized in student ability to present content and ask questions, to confirm understanding through self-assessment and the feedback they receive from their programming as well as the ability to inject knowledge from various sources as possible solutions to learning challenges, which are direct instruction indicators. Hase and Kenyon's (2007) design principles shed light on the ability of teaching presence indicators to illuminate teaching that differs from the traditional teacher-centered, discussion-based model. Both courses in this study take a learner-centered, dialogue-based approach to learning where the learner herself determines the details of her learning process with the support primarily of her fellow learners and the course teacher when necessary.

Community of practice, "a learning partnership among people who find it useful to learn from and with each other about a particular domain" (Wenger et al, 2011, p. 9) also informs teaching presence in each of the courses in the investigation. Wenger et al. (2011) elaborate indicating that peers' "experience of practice" becomes a learning resource in communities of practice. While echoing Hase and Kenyon's (2007) principle of knowledge sharing to develop capability, this framework is designed to measure learning value and as such has a different orientation. The term community as used in this framework shares some characteristics of Dron and Anderson's (2014) educational groups and while the courses' organizational social

frameworks are education groups, the working social formats are networks which Wenger et al. (2011) indicate are the drivers of community action.

Teaching presence indicators intersect with community of practice indicators as shown in Appendix B. The direct instruction indicators - presenting content and questions for consideration and injecting knowledge from diverse sources reflect the knowledge capital indicators of tangible capital – resources. Access to resources for course participants is a crucial element in students' learning processes as it allows for informational currency. Human capital in the form of key information or new ideas also support students' efforts to remain current. While currency is a learning outcome rather than a teaching presence indicator, it is also a focus of a connectivist approach, showing an intersection of the community of practice framework and connectivist principles. This intersection is evidence of the mashup approach to the instructional design of the courses.

Currency requires support from fellow participants in the form of cooperation in sharing information that adds value to their work. While each student is striving for currency in order to use the most up-to-date strategies in her work, each student's work reflects their particular interest and so there is no common assignment about which to share information and strategies. Cooperative learning theory, with its greater emphasis on independent yet related work, addresses this situation. Paulsen's freedom of content addresses the cooperation that students exhibit in these courses.

Transparency is achieved in the courses studied here through personal home pages which were completed to various degrees and through a photo or image associated with the participant's identity and displayed with each post. This allows other participants to readily identify postings visually rather than searching the print for names. Participants also exercise transparency in their posts and learning journals and diaries to the degree with which they are comfortable. In Case A, the teacher demonstrated transparency in admitting that he had not "come across Geany [a platform] before" (C1-I1-P8). For many teachers in traditional courses, admitting to not being familiar with a computer platform might be a threat to their position as a knowledge keeper. In this course, the teacher's admission is a stigmerigic signal that students can have knowledge that is more up-to-date than the teacher and that the teaching role is a shared one.

Transparency supports cooperation in helping to set the climate for learning. A cooperative climate for learning encourages information sharing to extend beyond personal information to information about techniques, strategies and resources that were helpful in their learning. Students in each of these courses have freedoms within very general boundaries established by the institutional constraints that are required in courses offered for certification. As the courses are self-paced, they have both freedom of time in deciding how much of the six-month course period the will use for their study and also when during their daily schedules they will work on their course. This freedom of time allows student to complete their course within the time constraints imposed by other obligations such as work, and family commitments.

Freedom of space is extended to students through the affordances of the course sites. Unlike Moodle sites where students are influenced by the characteristics of the site to use a discussion communications format and where information provided is usually limited to text, this site accommodates pictures, video, and text. It has the affordances of a working space in which information can be stored as it is developed without the need to share it until the participant feels it is ready to be shared. This freedom of space expands the possibilities open to student to express their learning in ways that take them beyond the tradition academic approach. One value creation story-teller identified freedom of time and space as being an outcome that affected his success.

Being able to access the landing and the materials related to my course activities allowed me to complete activities in a flexible time frame. Being able to work when it suited me greatly enhanced my progress and ultimately my achievement in the course. C2-S12

This comment demonstrates the interdependence associated with freedom of time and space.

In another departure from traditional academic approaches, students enjoy freedom of pace in each of these courses. Generally, students are expected to match the learning pace set by the teacher. Traditionally, should a student meet with an aspect of the course that is problematic, she is expected to work on her own, and if she is not able to, it puts her in jeopardy of failing the course, particularly if the trouble point is crucial in a learning sequence. In these courses, students set their own pace ranging from finishing their programming in six weeks to taking the entire six- months and a few even requiring an extension. Summative assessment in each course was based on the student's learning diary or journal, so it was individualized and did not require the deadlines necessary when a common exam assesses student learning. This freedom shows an

aspect of the teaching presence indicator establishing time parameters. In this case the teaching presence indicator has been allocated to the students. Although the university sets a six-month time period for the course, students are free to set time parameters within the course that suit their life situations.

Closely related to freedom of content is freedom of medium. Students in each of these courses were able to choose the learning technologies that best supported their learning. Tutorials housed on YouTube, websites with code content, texts, and the support of more knowledgeable friends are all media students chose to assist their learning. Perhaps the most remarkable learning technology in each of these courses was the learning diaries or journals which house actionable knowledge – learning in connectivist terms. Students turned to this resource to obtain a sense of how the course proceeds, for information to solve specific problems, and to check to be sure they were on the right track. In a more traditional course approach, and in some cultures, this is considered cheating, but in these courses, it mirrors a working environment and is a reflection of connectivist characteristics. Relating freedom of medium to teaching presence indicators, the instructional design and organization indicator: utilizing the medium effectively is illustrated by the students in that they are free to choose media that are appropriate for their particular learning. There is also a connection to the direct instruction indicator: injecting knowledge from diverse sources. Students are both informed by and inform fellow students through exposure to information housed in various media. The soft nature of these course sites, their adaptability, allows much of their media to be accessed from the site.

Students exercise freedom of content in their work as they choose the details of their programming. In each of these courses, while the instructor outlined broad parameters for the programming required to demonstrate learning, the students are free to decide what content will give them the results they want. Students take control setting these aspects of the curriculum and design the methods whereby they will accomplish their goals. They use the facilitating discussion indicator of assessing the efficacy of the process, and if the process is found lacking, go back and redesign their approach. Based on their experience, students share content they find useful, often in answer to questions from other students, and when called for, focus their interactions on specific issues, making learning situated and contextual.

Anderson (2005) added freedom of relationship to address student choice, specifically choosing with whom to engage. However, this seems irrelevant in this environment. Students do

not participate in group work, in fact engagement is too strong a word for the brief exchanges through which students interact. There are few personal consequences involved in helping a fellow student out, other than the accumulation of social capital. Due to the self-organization of the courses, the benefits accrue to the course as well as to an individual. An increased positive climate for learning, and increased trust that the site participants provide help if it is needed strengthen the system as a whole more than they aid individuals.

Freedom of disclosure, however, does relate to activity in these courses. It refers to the ability to decide the level of privacy a student chooses to present herself to other course participants. In this environment, students disclose not only their work, but also potentially personal information such as their picture or icon, and other personal demographics. In both Cases A and B, privacy did not seem to be an issue within the group. Students were eager to demonstrate their skill and show their learning product. The possibility of using a high level of privacy (through restricting access to their posts to instructor only) is built into the courses and although students did not make use of it, it was there in the course designs. There was a variation in the levels of disclosure students employed. Some students were very open and gregarious, commenting on their life beyond course activities. Other students kept their contributions to course materials and revealed little of their life beyond the course. As with freedom of relationship, drawing in participants, and prompting discussion was not a major factor, due the course culture of cooperative sharing and the dialogue-based nature of the course. Course teachers did encourage, acknowledge or reinforce student contributions when contributions were beyond the ordinary. Students also exhibited this behavior by encouraging fellow students. The actions serve to set a climate for learning.

Dron and Anderson's (2014) decagon of cooperative freedoms added technology, method, relationship, delegation, and disclosure to Paulsen's (1993) work. Freedom of technology is related to freedom of medium in that tools with which a participant learns will often be in an online context, a medium. This freedom extends to student freedom to add more traditional tools such as paper and pencil to their online technologies. Freedom of technology relates to freedom of method which allows students to use strategies and approaches which suit their learning preferences. There was little indication in students' learning diaries and journals of students taking advantage of this freedom of method. Freedom of technology does relate to teaching presence in several areas. In instructional design and organization, designing methods

and utilizing the medium effectively both involve freedom of technology. Setting a climate for learning, and presenting content and questions for consideration, two indicators of facilitating discourse, involve the use of technology by subtly influencing both indicators. Confirming understanding through assessment and explanatory feedback, diagnosing misconceptions, and injecting knowledge from diverse sources – all direct instruction indicators – are also influenced by freedom of technology. Students' agency to use the technologies they deem necessary for their learning increases their control over their learning experience.

Freedom of method is more closely related to teaching presence indicators. As with freedom of technology, the instructional design and organization indicators of designing methods and utilizing the medium effectively are influenced by student agency. All of the facilitating discourse indicators relate to freedom of method, although in these courses, the instructional design favors a pragmatic approach to discourse, whereas the indicators suggest at dialectic learning approach. This, however, may be due to observations of the indicators in previous studies of threaded, discussion based courses with a teacher centric design. Like the facilitating discourse indicators, the direct instruction indicators all are related to freedom of method. Whether this is due to the course design which supports direct instruction, or due to student preference or a combination of both is the subject of further research.

Freedom of delegation – the freedom of when and whether to choose – is what Dron and Anderson (2014) term a meta-freedom. This refers to the decision to submit to another's control when insufficient knowledge impedes decisions about the next steps in a learning path. This freedom while not an option in traditional learning environments, is an important consideration in these courses. Freedom of delegation is critical to the heutagogical elements of the course as it is the basis for the student decision to ask for support when a problem is encountered. This freedom dovetails with the connectivist principle of decision-making being a learning process in and of itself even though Siemens refers to decision making in terms of choosing what to learn and the meaning of information, while Dron focuses on the more basic freedom to decide. Students sometimes used the learning (actionable knowledge) that resides in learning diaries and journals to increase or confirm their knowledge base before proceeding with the course or as a scaffold when they encounter problems. In using other students' work, participants do submit, however briefly, to the control of another student. This action is a part of student's designing the method of their learning an action that intersects with freedom of method.

Summary

A mashup approach to the instructional design of these courses results in a rich, complex learning environment where students are able to determine the design of their learning journeys. The use of design specific to social software for e-learning, aspects of networked learning, connectivist, heutagogical, community of practice and cooperative learning principles combine to create dialogue-based cooperative learning. The course designs which promote self-organizing learning environments allow students agency to design their learning paths and direct the content used for learning, choose their level of cooperation and participate in dialogues in which information is offered to support fellow students' learning.

This design has implications for teaching presence indicators as proposed by Garrison et al. (1999). Indicators, particularly those in the instructional design and organization, and direct instruction categories take on nuanced meanings when they are initiated by students as opposed to teachers. Each of the instructional design and organization indicators relate to the agency students have to control the details of their learning and how they will accomplish it. Direct instruction indicators, particularly presenting content or questions for consideration and injecting knowledge from diverse sources form the basis of teaching actions initiated by students in these courses.

The cooperative, heutagogical basis of the course means that students will present content and questions of consideration, focus interactions on specific issues, inject knowledge from diverse sources and respond to the technical concerns of other participants. While cooperating with fellow students, students gain social capital and reinforce their knowledge as they make it part of their practice. Confirming their understanding through feedback provided by their programming gives formative assessment by showing students how successful their efforts were. Their self-assessment either confirms their understanding or alerts them to revise their programming. Students diagnose their misperceptions and often record them in the learning journals or diaries turning them into actionable knowledge from which other students can benefit. In this way, students' learning records become an example of the connectivist principle of learning (actionable knowledge) residing in non-human appliances.

This mashup approach to course design has allowed a new model for learning to emerge. As Dron and Anderson explain: "Emergent behaviors 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 that interactions of agents within it". (2014, p. 53)

As discussed above, this dialogue-based cooperative learning environment highlights facets of teaching presence generally assumed to be the purview of the official teacher, a knowledge keeper, despite the deliberate use of the term teaching to describe actions that prompt learning and signals departure from an objectivist approach. This study illustrates that teaching presence indicators are valuable in revealing teaching actions performed by participants other than those formally tasked with teaching.

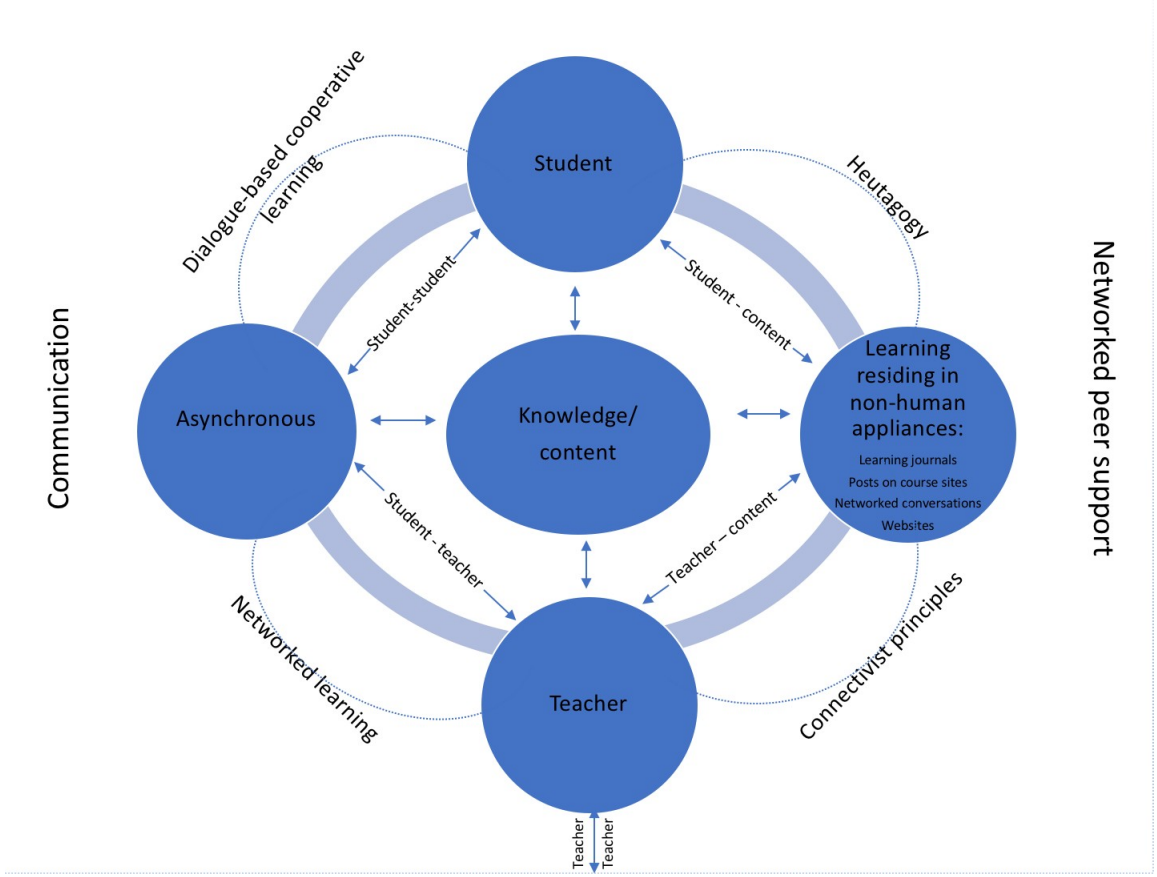


Figure 19. A model for dialogue-based cooperative e-learning.

Challenges. There were several challenges encountered during the course of the investigation. The inability to access participants directly, due to privacy laws and the lack of student e-mails at the university coupled with a lack of understanding of the organization of this part of the university, delayed the beginning of research by several months.

Once participants were recruited for the value creation story-teller portion of the investigation, several of the participants who had agreed to participate reconsidered. Chiefly among those was one of the course instructors who did not perceive the relevance of the questions and so declined to participate. His decision prompts question of accessibility of the value creation stories framework.

The nebulous nature of some of the teaching presence indicators prompted investigation into how they would appear in a learning environment further delaying coding and analysis. This challenge is addressed below with suggestions for further research. Several of the findings of this investigation deserve further consideration and these will also be addressed below.

The lack of coding reflecting facilitating discussion is somewhat problematic. In a course that is dialogue-based, indicators addressing discussion will not be recorded because there is no discussion. In order to broaden the applicability of the framework, changing the term discussion to interaction would allow the coding of actions in a dialogue-based learning environment.

The qualitative nature of the study makes replication difficult but as a preliminary exploration of teaching presence on the Landing, the purpose was to look at the quality of the actions rather than their quantity. Further research into the quality of teaching presence on the Landing will make this approach to teaching and learning more accessible to both instructors and students.

A final challenge that touched on all aspects of the study was the ethics of conducting a study in which two committee members were creators of the Landing and one of whom was a course creator. To limit undue influence on the research results, discussions were limited to research methodology and practice, and revisions to be made. Actions on the course site or the meaning of data collected were not topics of discussion with either committee member who were involved with the Landing.

An advantage to having a committee member who is also a course creator was his ability to validate the research results. As the only other researcher with access to the course sites, he was able to confirm the accuracy of the description of teaching presence in these courses. His participation was limited to a revision of the final draft, and was in line with the practices of action research and qualitative studies. In confirming the study results, he added to the validity of the investigation results.

Conclusion

Despite evidence showing that direct instruction indicators form the predominant teaching presence indicators in both Case A and Case B, a deeper examination reveals the role of instructional design and organization indicators in the creation of an environment which is both cooperative and connectivist. The addition of the social forms of groups, nets, and sets further enrichens the course sites and points to a mashup approach to instructional design. The design element of creating a learning journal both allows instructors to evaluate student progress and gives students a second opportunity to experience their learning journey while reflecting on it to deepen their knowledge. Over time, the journals create a repository that students are able to access to benefit from the learning experiences of others, allowing students to benefit from some of the affordances of a community of practice in the form of shared information, procedures, and strategies. As the repository grows and students become more adept at accurate tagging, it is conceivable that this repository will form a very valuable learning asset both for students and for the course in creating a type of organizational memory in the form of learning (actionable knowledge) residing in non-human appliances.

In addition to the repository which forms a learning space on the course sites, the sites exhibit three other learning environments or social forms as mentioned above. Educational groups, nets, and sets are social forms that were identified by Dron and Anderson (2014) in Teaching Crowds. Their rules of thumb began the definition of these forms. This investigation adds to this beginning in the first identification of educational groups, nets, and sets in formal course environments.

C2-S2's value creation story adds support to Shea et al.'s (2006) finding that there is a correlation between effective instructional design and students' experience of community. She stated in her value creation story that a personal outcome affecting her success was "meeting other students through these discussions . . . It made me feel like I was part of the community." Although the studies use different research approaches and the study sizes are very different, the connection between the instructional design of these courses and a sense of community adds to the validity of Shea et al.'s (2006) finding. The investigation of these courses has revealed several opportunities to enhance practice and topics that deserve further research. They are discussed below.

Implications for practice. Implications for practice resulting from this investigation range from suggestions prompted by philosophical considerations to very practical suggestions for taking advantage of the identification of existing indicators as well as the emergence of new forms of teaching presence on the Landing.

These courses on the Landing take a novel approach to promoting student learning in university courses. Course creators, instructors, and tutors using the Landing for delivery of self-paced courses need to be aware of their epistemological approach to teaching. In other words, they need to be aware of their understanding of how we know what we know. The Landing offers affordances for sharing information, strategies, and it is particularly suited to sharing procedures due to participants' ability to share photos and videos. The ability to link to YouTube in particular expands students' network far beyond the course boundaries.

Beginning with an awareness of the course creator's philosophical position allows optimal use of the site's affordances and the most efficient use of teaching presence beginning with instructional design and organization elements. The Landing supports a dialogue-based, cooperative, connectivist design. Awareness of this allows instructional designers and course participants – both instructors and tutors as well as students – to take full advantage of the tools the Landing offers to create teaching presence. It will require further study to assess the suitability of the Landing environment to other instructional design approaches.

Instructors and tutors can support students by keeping in mind the particular nature of the students in self-paced courses. For many students, this is their first experience with this course design in a higher education setting and an element of both setting curriculum and setting a climate for learning is reminding students (when needed) of their agency to contribute information to the course site and to show proof of their having shared with others on the site.

A related factor is the self-paced nature of these undergraduate courses. It is beneficial for course coordinators to keep in mind that continuous enrollment means that the actions that would normally be only completed at the beginning of a course, need to be repeated regularly as new students join the course group. For instructors in self-paced courses, frequent iterations of course expectations and reminders of where course information can be found is beneficial. While the practice of repeated reminders may seem redundant, student intake is continuous and so students benefit from repeated reminders. This is an area where the repository of previous

students' learning diaries/journals can be useful.

The collection of diaries/journals on the course site are referred to here as a repository. Berry (2016) referred to the same artifact as an archive. Siemens refers to the same tool as a non-human appliance. The use of a common term will help staff, students, and researchers be clear about what is being referred to and will incidentally aid in identifying research and information on the topic.

Similarly, the terms cooperative and collaborative need to be used precisely. In this investigation, cooperative actions between students were identified by one course instructor while the second course instructor referred to the same actions as collaborative.

Additionally, several of the teaching presence indicators would become more easily replicable if their meaning were more precise. Setting a climate for learning is a broad term which encapsulates a characteristic of a productive learning environment but does not provide information as to how this appears in an actual learning situation. The specifics of a learning climate will be different for different design approaches. For the term to be beneficial to those trying to incorporate it, examples of how this translates into teaching action would help clarify its meaning. Precision of terms will aid practitioners in applying teaching presence actions productively.

Instructors who wish to use the Landing for partial delivery of their courses would benefit from working with a knowledgeable instructional designer. Subject matter experts, who are also often course coordinators, generally do not have a background in pedagogy and so would benefit from the instructional designer's expertise, particularly if the instructional designer is also knowledgeable about the affordances of the Landing.

Implications for research. Instructors, tutors, instructional designers, and students will benefit from a clearer understanding of how teaching presence supports learning. Further research into teaching presence in non-traditional teaching environments and in other subject areas other than computing would add to the understanding of how teaching presence plays a role in learning. To date, teaching presence has been investigated in traditional courses where the teacher is a knowledge gate-keeper and students are expected to rely on the teacher for their learning. Teaching presence in a dialogue-based, cooperative learning environment showed evidence of supporting student

learning. Research into how teaching presence is evident in other learning environments would increase the category's validity.

Research into proposed additional categories promises to further illuminate student learning within communities of inquiry. Garrison (2007) noted the shift to socio-emotional support from social presence. Shea, Hayes, Uzuner-Smith, Gozza-Cohen, Vickers and Bidjerano (2014) proposed that learning presence be added to the three factor model to account for the forethought, planning, monitoring, adaptive strategies, and reflection on results that students employ in learning. Cleveland-Innes and Campbell (2015) to propose the addition of emotional presence: "the outward expression of emotion, affect, and feeling by individuals and among individuals in a community inquiry as the relate to and interact with the learning technology, course content, students and the instructor" (p. 283). This shift increases focus on the learner's experience. Daspit, Mims, and Zavatto (2015) suggested the addition of psychological capital to the three factor model in order to capture positive student motivation. Concurrently, Lam (2015) suggested autonomy presence to account for learner discourse in online communities of inquiry. Anderson (2016) proposed that agency presence would combine the elements proposed by Shea and Lam. Each of these proposed additions to the three factor model seeks to illuminate the learner experience in a community of inquiry. Further research will reveal their validity, their commonalities and their unique contributions to the learner's experience.

In addition to further exploration of the essence of learning in communities of inquiry, research is needed into the which types of learning are best pursued in this environment. Discussion-based asynchronous forums have been the instructional design most commonly apparent in community of inquiry literature. This investigation has shown that while teaching presence indicators were identified, they have a different appearance on the Landing than in a discussion-based learning environment. It is possible that teaching presence is a very adaptable category that takes on various appearances in response to the environment in which it is placed. In this way, teaching presence indicators take on new forms.

In the learning environment in this investigation, cooperative freedoms change the face of direct instruction by giving students agency to present content and questions, inject knowledge from diverse sources, and to respond to technical concerns. The subject matter of the courses (computer programming) both allows students to confirm their understanding through immediate formative assessment i.e. either their code works, or it does not and in the process prompts them

to diagnose misconceptions and errors. The students themselves respond to technical errors and in doing so, focus the dialogue on specific issues. Due to the networked nature of the courses, there is no discussion to summarize.

The instructional design and organization developed for these courses provides high levels of agency for students resulting in two aspects of designing methods. Traditionally, all methods designed for a course are created by the teacher. In this design, the teacher created the macro-design which creates an environment to allow a great amount of freedom. Part of this freedom for students is the ability to design their learning approach and strategy – micro-designs, actions that are included in the learning presence indicators proposed by Shea and Bidjerano (2010). In this sense, students also have a voice in setting the curriculum. Like designing methods, setting the curriculum is carried out at a macro level by the course creator and on a micro level by the students. In these courses, students choose actions that will allow them to demonstrate their mastery of the course learning outcomes and in that sense set their personal curriculum. Students also establish time parameters for their learning within the macro parameters set by the institution. Within that time frame, students exercise their freedom of time (Paulsen, 2010) to decide how long they will take to illustrate their mastery of the learning outcomes and when they will work on the course due to the fact that there are no prescribed meeting times. Students also are able to choose how they will use the medium afforded by the course sites on the Landing to accomplish their learning goals and publish the results of their studies. Netiquette is established by the instructor, but maintained by the students. Although the networked social format on which communication in the courses rests does not favor extensive discourse, exchanges due to this design are brief but cordial. Students aid each other in providing information and problem-solving strategies. These efforts illustrate the aspect of netiquette that remembers the human.

The indicators showing facilitating discourse are less evident in this design than in the previous two categories. This is due to the nature of communication in this e-learning model which is dialogue-based and so does not rely on discussion, consensus and understanding or areas of agreement and disagreement. In this instructional design, students are not overtly encouraged to make contribution. Contributions to the knowledge base result from engagement with the topic as opposed to prompts from the teacher. Setting a climate for learning is another indicator that is exercised on two levels. The instructor sets a climate for learning at a macro

level and students reinforce it on a personal level in their own learning and in supporting the learning of fellow learners.

Each of these categories will benefit from further research examining them in this e-learning model in terms of emotional presence, learning presence, autonomy presence, agency presence, and psychological capital. Such research could reveal common areas of learning actions and allow for the combination of some of the proposed presences such as Anderson's (2016) proposal of agency presence combined with Shea and Bidjerano's (2010 and Lam's (2015) proposed presences.

The proposal of dialogue-based cooperative e-learning suggests another area of research. Two computing courses were chosen for this investigation for two reasons. The first was to create a balanced comparison to minimize possible variables. The second reason was the popularity of each of the courses. They both enjoy continuous enrollment, facilitating the research design. Computing is a subject that lends itself to dialogue-based cooperative learning. It is a subject are that does not require extended discussion. Students exchange information in short posts. The field is expanding at a rate that makes subject matter expertise fluid. Further research is required to verify the utility of this instruction design in other learning contexts. For example, courses requiring extended discussion and collaboration may not be compatible with this e-learning model.

Learning journals are known to be a technique to promote reflection on learning experiences. Research to examine the use of learning journals as aspects of the teaching presence actions, particularly confirming understanding through assessment could provide insight into how these journals support learning.

As mentioned above, this investigation is the first to examine educational groups, nets, and sets as social forms in a learning environment. Their roles and affordances in various learning environments in terms of their utility, and pitfalls are open to research.

These courses are fertile ground for research over a longer period of time to investigate the self-organizing aspects of these learning systems. This research could take two approaches. One approach could focus on course characteristics and how the system changes over a longer period of time. The second approach could center on individual students and whether they change over their time as participants in the course.

Further study into the use of the value creation framework and interplay between the

cycles and the value creation stories would serve to clarify the tensions between the two and their role in supporting learning.

This study used the value creation framework to try to extract the voices of students and teachers and was only partially successful –in part due to very low numbers. Further qualitative and quantitative studies that provide both the individual voice and the indicators of value creation will strengthen the framework.

In conclusion, the role of platforms such as YouTube or Vimeo as appliances for learning deserves further research. Its use was only mentioned in this study and its possibilities for supporting learning in e-learning environments deserve further examination.

Final Words

Research into teaching presence in two self-paced undergraduate courses partially delivered on the Landing revealed the importance of instructional design and organization in providing a learning environment in which students could use cooperative, connectivist learning strategies in a dialogue-based learning environment to co-create knowledge with their fellow students and course coordinators. The design element requiring students to maintain a learning diary or journal created a resource that both allowed students a second examination of their learning and time to reflect on it as well as a repository for other students to access to support their own learning and a basis for summative assessment. Repositories as an instructional design element show promise for other course formats delivered as e-learning.

Although revealed in a small sample size, the finding of a correlation of between effective instructional design and students' experience of community supports Shea et al.'s (2006) finding of the same correlation. It also demonstrates the utility of value creation stories to reveal learning value.

The rich learning environment created by using a mashup instructional design approach offers both challenges and benefits to students in these courses. While students generally are able to adapt to these different learning environments, instructional designers and course creators face greater difficulties. A great deal of time and effort is needed to develop a knowledge of the power and advantages of various pedagogies as well as the affordances of the platforms and software available in order to make use of the systems characteristics that drive courses such as were studied here. As the tools become more accessible, more people will step up to take

advantage of these learning environments.

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Appendix A: Comparison of taxonomy of discussion indicators with teaching presence indicators.

Taxonomy of discussion indicators Participatory indicators	Teaching presence indicators
Identifying (oneself)	• Instructional design and organization • Using the medium effectively • Establishing netiquette
Naming (a person)	• Instructional design and organization: using the medium effectively, netiquette.
Referring (to what a person has said)	• Instructional design and organization: using the medium effectively, netiquette
Acknowledging (an earlier statement by name)	• Facilitating discourse: encouraging, acknowledging or reinforcing student contributions
Asking (in a general sense)	• Direct instruction: presenting content and questions for consideration
Requesting (in a general sense)	• No teaching presence equivalent
Factual contributions	Teaching presence indicators
Presentations	• Direct instruction: presenting content and questions, focusing discussion on particular issues, summarizing discussion, injecting knowledge from diverse sources, confirming understanding • Facilitating discourse: identifying areas of agreement and disagreement, seeking to reach consensus or understanding
Proposals	• No teaching presence equivalent
Requests for facts related to the problem	• Direct instruction: presenting questions, focusing discussion of specific issues, confirming understanding
Eventual solutions	• Direct instruction: confirming understanding, injecting knowledge from different sources • Facilitating discourse: identifying

Reflective contributions	Teaching presences
Question what is said	• Direct instruction: presenting content and questions, focusing discussion on specific issues, confirming understanding, diagnosing misconceptions • Facilitating discourse: drawing in participants, prompting discussion
Substantiate agreement or disagreement with other participants' statements	• Direct instruction: presenting content and questions for consideration: focusing discussion on specific issues, confirming understanding, diagnosing misperceptions, injecting knowledge from diverse sources • Facilitating discourse: identifying areas of agreement or disagreement (a step toward substantiation), seeking to reach consensus/understanding, drawing in participants, prompting discussion
Learning contributions	Teaching presences
Statements that show learner(s) open to new possibilities that were not previously part of constructed knowledge	• Facilitating discourse: seeking to reach consensus/understanding

Appendix B: Comparison of teaching presence indicators and value creation indicators.

Community of inquiry indicators	**Community of practice value indicators**	**Value cycle indicators**
Design and organization:	**Resources for Implementing Strategies**	**Cycle 2 – Knowledge Capital Indicators**
• Establishing time parameters • Utilizing the medium effectively • Establishing Netiquette	benefit: short term to organization improves: business outcomes	Quality of output: Evaluation of products Documentation: Archives Cycle 3 – Change Indicators Innovation in practice: New ways of doing things Use of tools and documents to inform practice: self-report (feedback on tools and documents from people who have used them Cycle 4 – Performance improvement indicators Personal performance: Speed and accuracy, student achievements Organizational performance: student achievements and satisfaction Organizational reputation: Ability to attract projects related to domain Knowledge products as performance: Clients interested in knowledge itself

Community of inquiry indicators	**Community of practice value indicators**	**Value cycle indicators**
Design and organization:	**Resources for Implementing Strategies**	
		Cycle 5 – Reframing indicators Community aspirations: New learning agenda New discourse about value New vision Relationships with stakeholders: Different conversations with stakeholders Involvement of new stakeholders New frameworks: New social . . . systems (emerging or created)
• Identifying areas of agreement/disagreement	Arena for problem Solving benefit: short term to organization improves: business outcomes Helps with challenges benefit: short term to community members improves: experience of work Sense of belonging benefit: short term to community members improves: experience of work	Cycle1- Activity/interaction indicators Level of engagement: Intensity of discussions Challenges of assumptions Quality of interactions: Debates on important issues Cycle 2- Knowledge capital indicators Change in perspective: self- reports Level of trust: bringing up difficult problems and failures from practice Cycle 3– Change indicators Use of social connections: collaborative arrangements Leveraging connections in the accomplishments of tasks

Facilitating discourse:	Community of practice value indicators	Value cycle indicators
• Seeking to reach consensus or understanding	Capacity for knowledge development projects benefit: long term develops: organizational capabilities Arena for problem solving benefit: short term to organization improves: business outcome Help with challenges benefit: short term to community members improves: experience of work More meaningful participation benefit: short term to community members improves: experience of work	Cycle 4 – Performance improvement indicators Organizational performance: project assessments Cycle 1– Activities/interactions indicators Level of engagement: intensity of discussions Challenges of assumptions: Bringing experience of practice into the learning space Quality of interactions: Debates on important issues Feedback on quality of responses to queries Value of participation: People coming back to community or re-engaging with the network Collaboration: joint projects Co-authorship Cycle 2 – Knowledge capital indicators Change in perspective: self-reports Level of trust: bringing up difficult problems and failures from practice Cycle 5- Reframing indicators Community aspirations: new discourse about value, new vision

Facilitating discourse:	**Community of practice value indicators**	**Value cycle indicators**
• Encouraging, acknowledging or reinforcing student contributions	Sense of belonging benefit: short term to community members improves: experience of work Capacity for knowledge development projects benefit: long term develops: organizational capabilities Arena for problem solving benefit: short term to organization improves: business outcomes Ability to take risks with the backing of the community benefit: short term to organization improves: business outcomes Better able to contribute to the team benefit: short term to community members improves: experience of work	Cycle 1 – Activities/interactions indicators Level of participation: logs and website statistics Level of activity: number of queries Quality of interactions feedback on quality of responses to queries Cycle 2 – Knowledge capital indicators Inspiration: retention rates of members Confidence: initiatives started and /or risks taken by members Cycle 3 – Change indicators Implementation of advice/solutions/insights: self-reports, follow-up Innovation in practice: new ways of doing things Transferring learning practices: using communities, networks or other peer-to-peer processes and tools for learning in other contexts Cycle 5 – Reframing indicators Assessment: new assessment processes Relationship with stakeholders: different conversations with stakeholders, involvement of new stakeholders, new set of expectations

Facilitating discourse:	**Community of practice value indicators**	**Value cycle indicators**
	Help with challenges benefits: short term to community members improves: experience of work Confidence in one's approach to problems benefit: short term to community members improves: experience of work More meaningful participation benefit: short term to community members improves: experience of work Sense of belonging benefit: short term to community members improves: experience of work Capacity for knowledge development projects benefit: long term develops: organizational capabilities Knowledge-based alliances benefit: long term develops: organizational capabilities Capacity to develop new strategic options benefit: long term develops: organizational capabilities	Cycle 1 – Activities/interactions indicators Level of participation: number and characteristics of active participants, people who subscribe to a site, log and website statistics Level of activity: frequency of meetings (posts), number of queries, quantity and timeliness of responses Level of engagement: intensity of discussions, challenges of assumptions, length of threads Quality of interactions: bringing experience of practice into the learning space, debates on important issues, feedback on quality of responses to queries Value of participation: people coming back to community or re-engaging with the network

Facilitating discourse:	**Community of practice value indicators**	**Value cycle indicators**
• Setting a climate for learning	Capacity to develop new strategic options benefit: long term develops: organizational capabilities Forum for expanding skills and expertise benefit: long term fosters: professional development Arena for problem solving benefit: short term to organization improves: business outcomes More perspectives on problems benefit: short term to organization Ability to take risks with the backing of the community benefit: short term to organization improves: business outcomes Better able to contribute to the team benefit: short term to community members improves: experience of work Confidence in one's approach to problems benefit: short term to community members improves: experience of work	Cycle 2 – Knowledge capital indicators Inspiration: retention rates of members Confidence: initiatives started and/or risks taken by members Level of trust: bringing up difficult problems and failures from practice Cycle 3 – Change indicators Use of social connections: collaborative arrangements, leveraging connections in the accomplishment of tasks Cycle 5 – Reframing indicators Relationships with stakeholders: new sets of expectations Cycle 1 – Activities/interactions indicators Level of participation: attendance at meetings, number and characteristics of active participants, people who subscribe to a site, weblogs and website statistics Level of activity: number of queries, quantity and timeliness of responses

Facilitating discourse:	**Community of practice value indicators**	**Value cycle indicators**
• Focus discussion on particular issues • Summarize discussion	Arena for problem solving benefit: short term to organization improves: business outcomes Ability to take risks with the backing of the community benefit: short term to organization improves: business outcomes Help with challenges benefit: short term to community members improves: experience of work Access to expertise benefit; short term to community members improves: experience of work Arena for problem solving benefit: short term to organization improves: business outcomes Quick answers to questions benefit: short term to organization improves: business outcomes and Expertise benefit: long term fosters: professional development	Cycle 5 – Reframing indicators Relationships with different stakeholders: different conversations with stakeholders, new sets of expectations Cycle 1 – Activities/interactions indicator Level of engagement: intensity of discussions, challenges of assumptions Cycle 2 – Knowledge capital indicators Information received: self-reports, threads read Change in perspective: self-reports

Facilitating discourse:	**Community of practice value indicators**	**Value cycle indicators**
• Respond to technical concerns	Access to expertise benefit: short term to community members Better able to contribute to the team benefit: short term to community members improves: experience of work Confidence in one's approach to problems benefit: short term to community members improves: experience of work More meaningful participation benefit: short term to community members improves: experience of work Sense of belonging benefit: short term to community members improves: experience of work Sense of belonging benefit: experience of work Resources for Implementing Strategies benefit: short term to organization improves; business outcomes	Cycle 2 – Knowledge capital indicators Skills acquired: self-reports and interviews Cycle 3 – Change indicators Use of tools and documents to inform practice: self-report, indicators of value in application Innovation in systems: new processes Cycle 4 – Performance improvement indicators Personal performance: speed and accuracy, student achievements Organizational performance: client satisfaction, project assessments, student achievement

Appendix C: Value creation story template.

Value-creation story: empty template for any professional

Note that the story does not need to start at 1or go all the way to 5.

Name:

Typical cycles

Your story:

1. Activity:

Describe a meaningful activity you participated in and your experience of it (e.g., a conversation, a working session, a project, etc.).

2. Output:

Describe a specific resource this activity produced for you (e.g., an idea, a link to information, or a document) and why you thought it might be useful.

3. Application:

Tell how you used this resource in your work in the course and what it enabled that would not have happened otherwise.

4. Outcome:

a. Personal: Explain how it affected your success (e.g., being a better professional, job satisfaction,) outcomes.

b. Organizational: Has your participation contributed to the success of your organization (e.g., increasing completion rates)?

5. New definition of success:

Sometimes, such a story changes your understanding of what success is. If it happened this time, then include this here.

Sample revised value creation story template.

Value-creation story: empty template for any professional

Note that the story does not need to start at 1or go all the way to 5.

Name:

Typical cycles

Your story:

1. Activity:

Describe a meaningful activity you participated in on the Landing and your experience of it (e.g., a conversation, a helpful artifact, a useful connection etc.).

2. Output:

Describe a specific resource this activity produced for you (e.g., an idea or a document) and why you thought it might be useful.

3. Application:

Tell how you used this resource in your practice and what it enabled that would not have happened otherwise.

4. Outcome:

a. Personal: Explain how it affected your success (e.g., being a better instructor/student, job/learning satisfaction,) outcomes.

b. Organizational: Has your participation contributed to the success of Athabasca University. (e.g., metrics they use)?

5. New definition of success:

Sometimes, such a story changes your understanding of what success is. If it happened this time, then include this here.

Appendix D: Sample value creation story.

Value-creation story: filled-out example for a teacher

Name The math network

Typical cycles Your story:

1. Activity:

Describe a meaningful activity you participated in and your experience of it (e.g., a conversation, a working session, a project, etc.)

I was attending a teacher's meeting and everyone there was quite engaged in the conversation. Someone was describing his difficulties getting kids to understand the idea underlying the Pythagorean theorem and its applications. A teacher from Utrecht told us about an activity she has been using. I thought it sounded really good. I and some other teachers became quite excited and asked a lot question. We spent the rest of the meeting on it.

2. Output:

Describe a specific resource this activity produced for you (e.g., an idea or a document) and why you thought it might be useful.

The idea of the activity is to get the kids to work in small groups, doing puzzles with pieces of cardboard of different sizes of triangles. It is quite subtle because to get the idea of the theorem, they have to really fit all the pieces together and explain why it works. We actually tried the idea together as if we were students. She even gave us some templates so we could prepare the pieces of cardboard ourselves.

3. Application:

Tell how you used this resource in your practice and what it enabled that would not have happened otherwise.

When I got home that evening, I started to prepare my own pieces of cardboard. I was really excited. Two weeks later, I used the activity with my third-grade class. It took a little while for them to get the idea. I had to adapt it a little bit because of the age of the students and I used a few pieces less. The class had really never been so attentive. The kids seemed quite happy when they left that day.

4. Outcome:

a. Personal: Explain how it affected your success (e.g., being a better teacher, job satisfaction, student's grade)

b. Organizational: Has your participation contributed to the success of your organization (e.g., metrics they use)

Two months later, when the kids took the national exam, I was in for a surprise. All but one got a perfect score on the chapter on triangles and the Pythagorean theorem. That had never happened to me. The headmaster called me in her office and told me that my kids had done so well, the school had received a letter from the testing service to ask whether there could have been some cheating. After we checked everything, I received some special mention in the national teacher registry.

5. New definition of success:

Sometimes, such a story changes your understanding of what success is. If it happened this time, then include this here.

What I realized after that is that what mattered most for my kids was not just their ability to do the activities on the curriculum, but also to be involved with concepts practically so they have a deeper understanding of the ideas underlying the theorems they are learning.

Appendix E: Measures of value creation for each cycle.

Cycle 1. Activities/interaction indicators	
Typical indicators	Potential sources of data
Level of participation	• posts on the Landing • posts beyond minimum requirements
Level of activity	• number of queries • number and timeliness of responses
Level of engagement	• intensity of discussion • depth of interactions • challenges of assumption (as measured by teaching presence indicators and taxonomy of discussion indicators) • length of threads
Quality of interactions	• bringing experience of practice onto the Landing • debates on important issues • feedback on the quality of responses to queries
Value of participation	• people coming back to the discussion or re-engaging with the network • evidence of fun (laughter)
Networking	• new connections made • number of contacts
Value of connections	• frequency of interactions
Collaboration	• projects • authorship
Reflection	• meta-conversations about • community network

Cycle 2. Knowledge capital indicators	
Typical Indicators	Potential data sources
Skills acquired	• value creation stories • community reflections
Information received	• value creation stories • threads read and commented on
Inspiration	
Confidence	
Types and intensity of social relationship	
Structural shape of networks	
Level of trust	
Production of tools and documents to initiate practice	
Documentation	
Reputation of the community	
New views of learning	
Quality of output	
Change in perspective	• self-reports (blogs, responses) • value creation stories

Cycle 3. Change indicators	
Typical indicators	Potential sources of data
Implementation of advice/solutions/insights	• self-reports • follow-up
Innovation in practice	• new ways of doing things • new perspectives • new concepts and language
Use of tools and documents to inform practice	• self-report e.g. feedback on documents and tools from people who have peer-reviewed them or used them • indicators of value in application
Reuse of products	• self-report of reuse
Use of social connections	• collaborative arrangements • leveraging connections in the accomplishments of tasks
Innovation in systems	• new processes • new policies
Transferring learning practices	• using communities, networks, or other peer-to-peer processes and tools for learning in other contexts

Cycle 4. Performance improvement indicators	Potential sources of data
Typical indicators	Potential sources of data
Personal performance	• self-report of improvement • student achievement
Organizational performance	• student satisfaction • increased achievement (marks) • project assessments
Organizational reputation	• student feedback
Knowledge products as performance	• students interested in knowledge itself • sharing of knowledge products on the Landing

Cycle 5. Reframing indicators	Potential sources of data
Typical indicators	Potential sources of data
Community aspirations	• new learning agenda • new discourse about value • new vision
Assessment	• new metrics • new assessment processes
Relationship with stakeholders	• different conversations with stakeholders • involvement of new stakeholders • new sets of expectations
Institutional changes	• new strategic directions that reflect the new understanding
New frameworks	• new social, institutional, legal or political systems (emerging or created)

Appendix F: Notification of intent to research teaching presence in courses.

All Course Participants

Dear Students of XXXX_____,

I am a doctoral candidate in the Doctor of Distance Education program at Athabasca University. I am researching teacher presence in self-paced undergraduate courses delivered on the Landing. I will be examining posts that students and teachers in your course have made in Sept., Oct., and Nov. 2016 to determine how teaching actions occur on the Landing.

In order to comply with Canadian and university ethics requirements, I am assuring you that all participants in the study will remain completely anonymous. My interest is in teaching actions on the Landing and my only concern with identity is whether an action is completed by an instructor or by students. I will be keeping the data I collect securely for one year, after which it will be destroyed. Should you not wish to be a part of this study, please send me a message to my inbox on the Landing and I will exclude you from the study.

If you have any concerns regarding my research and your role in it, please send a message to my inbox on the Landing and I will reply promptly. If you wish you may also contact my research supervisor, Dr. Terry Anderson on the Landing as well.

Thanking you in advance for your participation,

Mary McNabb M. Ed.

Professors and Instructors

Dear [Insert name],

I am a doctoral candidate in the Doctor of Distance Education program at Athabasca University. I am researching teacher presence in self-paced undergraduate courses delivered on the Landing. I will be examining posts that students and teachers in your course have made in Sept., Oct., and Nov. 2016 to determine how teaching actions occur on the Landing.

This letter is to ask your permission to study your course as part of my research. My investigation of teaching presence is to gain an understanding of how teaching occurs in self-paced undergraduate courses on the Landing. I hope to identify teaching strategies (both those carried out by formal instructors and those performed by students) to add to the knowledge of how the community of inquiry supports learning in this environment.

In order to comply with Canadian and university ethics requirements, I am assuring you that all participants in the study will remain anonymous. Participants will be identified with an alpha-numeric tag. I will be keeping the data I collect securely for one year, after which it will be destroyed.

Of course, if you would prefer not to be a part of this study, or if you have questions or concerns, please send a message to my inbox on the Landing and I will reply promptly. If you wish you may also contact my research supervisor, Dr. Terry Anderson on the Landing as well.
Thanking you in advance for your participation,
Mary McNabb M.Ed.

Course Participants Selected to Complete Value Creation Stories

Dear Name of student or staff,

I am a doctoral student who has been investigating teaching presence in your course for the months of Sept., Oct., and Nov. 2016. As part of my investigation, I am measuring the value teaching presence creates in your course. Your participation on the Landing has led me to ask you to fill out a short value creation survey (the survey will take approximately a half an hour to complete). Should you choose to respond and submit the survey, you receive a $25.00 gift Amazon gift certificate in recognition of your participation.

If you wish to complete the survey, please respond to this letter by messaging me on the Landing.

Thank you in advance for you interest and co-operation.

MARY MCNABB M.ED.

Appendix G: Request for permission to use value creation story template.

To: Marina Pangram

Dear Marina,

I am a doctoral student at Athabasca University in Canada. This e-mail is to ask permission to use Wenger, Trayner, and de Laat's Value-creation story template in my dissertation proposal and then in my subsequent research.

Thank you for your attention to this matter,

Mary McNabb M. Ed.

Beste Marina,

Ik ben een doctoraal student aan Athabasca University in Canada. Deze e-mail is om toestemming te vragen om Wenger, Trayner, en Value-scheppingsverhaal template de Laat's gebruiken in mijn proefschrift voorstel en vervolgens in mijn latere onderzoek.

Dank u voor uw aandacht voor deze zaak,

Mary McNabb M. Ed.

April 8, 2014

hi mary

thanks for your interest in iur work and of course feel free to use and build on our work

simply just refer to it in the ways we normally do

also, i would be interest to hear more about your work as you progress with using our framework

thank,

MAARTEN

Appendix H: Ethics Approval

Athabasca University
RESEARCH CENTRE

CERTIFICATION OF ETHICAL APPROVAL

The Athabasca University Research Ethics Board (AUREB) has reviewed and approved the research project noted below. The AUREB is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS) and Athabasca University Policy and Procedures.

Ethics File No.: 22295

Principal Investigator:
Ms. Mary McNabb, Graduate Student
Centre for Distance Education\Doctor of Education in Distance Education

Supervisor:
Dr. Terry Anderson (Supervisor)

Project Title:
An Investigation of Teaching Presence on Athabasca University's E-learning Commons: the Landing

Effective Date: September 27, 2016 Expiry Date: September 26, 2017

Restrictions:

Any modification or amendment to the approved research must be submitted to the AUREB for approval.

Ethical approval is valid for a period of one year. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.

A Project Completion (Final) Report must be submitted when the research is complete (i.e. all participant contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable)) or the research is terminated.

Approved by: Date: September 27, 2016

Debra Hoven, Chair
Centre for Distance Education, Departmental Ethics Review Committee

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Athabasca University Research Ethics Board
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