Connectivist Knowledge Building, Collaborative Learning, and Social Presence in a Connectivist Massive Open Online Course: A Study of PLENK2010

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ABSTRACT

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The pedagogy of connectivist massive open online courses (cMOOCs) is based on the new learning theory proposed by G. Siemens in 2004. This theory, called connectivism, takes to consideration the changes in learning process as a result of advancements in technology. The first cMOOCs, completely open and online courses, attracted thousands of participants from all over the world. The popularity of cMOOCs later gave rise to xMOOCs – massive online courses based on more traditional behaviourist theory. This study examines student interactions in weekly discussion forums of PLENK2010 - a cMOOC that ran for ten weeks in Fall 2010. The goal of this research is to investigate whether the student interaction in the context of weekly forums supports the ideas of connectivist knowledge building, allows for collaborative work to happen, and increases the sense of social presence. Using qualitative content analysis to analyse over 2000 forum posts, it was found that PLENK2010 was successful in fostering collaboration between students. The levels of social presence in the course were high and connectivist learning processes were shown to be successfully fulfilled. Results from this study can help to better explain ways of increasing the sense of presence in xMOOCs and promoting teamwork and collaboration through discussion forums in online course environments.

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I dedicate this with all my love
to my family

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CHAPTER 1 - INTRODUCTION

It is hard to deny that technology plays an important role in today's educational process, both within and outside of academic settings. Every day in North America, Europe, Australia and other parts of the world, more and more courses are using different types of course management software (FirstClass, WebCT, and Moodle, to name a few). More professors use email to communicate with students, and more and more courses are offered in the distance education format. Access to technology has changed the way we retrieve, store, and sort through information. Today, a quick Google search can reveal answers to a variety of questions on different topics and point out resources, articles, blog posts, and books with relevant information. Technology also allows for user-generated and user-created knowledge (ex. Wikipedia). Finally, technology offers immediate connectivity; through social networking websites, online chat rooms and forums, or via email and blog posts, today's students are more connected than ever before.

The use of technology in educational settings allows for new types of collaboration and interaction between students. With the advancement of technological tools, students are now able to communicate easily with one another outside of the classroom - no matter how big the distance between them may be. The influence of technology does not end with communication. New forms of projects such as wikis, online discussion boards, and online group-work environments have been developed to support student collaboration. Discussion forums allow for text-based asynchronous notes with automatic discussion-tracking threads and are one of the most common tools for student online interaction (Guzdial & Turns, 2000). For courses delivered in a strictly online format, these forums serve as a substitute for the in-class discussions and can be used for additional interactions and collaboration between participants (Jonassen & Reeves, 1996; McGiven, 1994; Wagner, 1993).Research indicates that online discussions promote higher-order thinking skills and foster knowledge constructions (Carswell, Thomas, Petre, Price, & Richard, 2000; Mandernach, Dailey-Hebert, & Donnelli-Sallee, 2007; Romiszowski & Mason, 2004; Schrie, 2006; Stahl, 2004).Furthermore, online discussions encourage reflection, idea synthesis, and critical thinking (Newman, Johnson, Webb, & Cochrane, 1997).

With the advancement of technology, the overall concept of distance education has also been changing. The first distance education courses were available as correspondence courses, with students receiving packaged learning material and sending their responses via mail to the teacher. Today, distance education courses are mostly done online via internet connection. In

fact, more and more universities offer fully online degrees for undergraduate and graduate levels. Using an online learning environment, students can experience connections and feel like an active participant in the course despite not meeting in a classroom. However, the problems of isolation in this type of learning environment cannot be disregarded. The traditional classroom environment includes interaction between students and teachers (Picciano, 2002). The same level of interaction is essential for successful technology-mediated learning, especially since this type of learning is lacking non-verbal cues such as body language and facial expressions (Harasim, 1995). To ensure that students feel included in the course, it needs to have a certain level of social presence - allowing students to project themselves socially as 'real' people (Garrison, Anderson, & Archer, 2000). Learning communities with high levels of social presence have higher student satisfaction (Richardson & Swan, 2003) and result in deeper learning (Bibeau, 2001).

Technology does not only change the ways in which students interact, collaborate, and construct knowledge. The past several years have shown a rise in new types of courses called massive open online courses (MOOC). These are free university courses available online for students from all over the world. Using various types of MOOC platforms, students can register for and complete courses from Harvard, Yale, MIT, or any other university. MOOCs have been receiving lots of attention from educators, media, and even economists. The year 2012 was unofficially called a year of a MOOC when MOOC providers such as Coursera, Udacity, and edX emerged and got extremely popular in a very short time. MOOC phenomenon continues to grow as more universities open their courses and as various organizations design courses to fit the MOOC model.

While the popularity of these new MOOCs (referred to as xMOOCs) is growing, not everyone knows that the first massive open courses (cMOOCs) were different from the ones commonly found today. Ideas for cMOOC pedagogy came from connectivism – a learning theory proposed by George Siemens in 2005. The underlying pedagogy and theories for cMOOCs are drastically different from the more traditional pedagogy of today's xMOOCs. cMOOCs are truly open in terms of participation and access to material and promote connection building between students for an ongoing learning process. Fueled by the connectivism theory and based on ideas of connection-building in an online environment, cMOOCs can be an ideal place to study various examples of students' collaborative work and knowledge.

Today, most research is dedicated to examining xMOOCs and research on cMOOCs remains rather limited. This thesis is adding to the small body of existing cMOOC studies and focuses on weekly online forums in – a cMOOC that ran for ten weeks in Fall 2010. The goal of this research is to investigate whether student interaction in online weekly cMOOC forums can support collaboration, connectivist knowledge building, and increased social presence. To answer these questions research employs a qualitative content analysis–a content analysis method focused on various characteristics of language.

CHAPTER 2 - LITERATURE REVIEW

Connectivism

The concepts of connectedness, easy access to information, and knowledge generation in a technological age gave rise to a new learning theory: connectivism. This learning theory was proposed by George Siemens (Associate Director of Research and Development with the Learning Technologies Center at the University of Manitoba). Siemens' research and experiences showed that none of the existing learning theories provided explanation for the "changing nature of learning and learners in the age of technological advances" (Darrow, 2009, p. 1). A new learning theory was required to encompass the complexity of informational resources, the increased use of technology, and the abundance of easily accessible knowledge. Siemens stated that it was important to acknowledge the fact that learning could occur outside of the person (Siemens, 2004). Until connectivism, none of the previously existing learning theories did so: "even social constructivist views, which hold that learning is a socially enacted process, promotes the principality of the individual (and her/his physical presence – i.e. brain-based) in learning" (Siemens, 2004, Limitations of Behaviorism, Cognitivism, and Constructivism section, para 1). In his 2004 paper titled "Connectivism: A Learning Theory for the Digital Age", Siemens outlined major principles of this new theory:

- Learning and knowledge rests in diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- The capacity to know more is more critical than what is currently known.
- Nurturing and maintaining connections is needed to facilitate continual learning.
- The ability to see connections between fields, ideas, and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision. (Siemens, 2004, Connectivism section, para 1)

Connectivism integrates the principles of network-building, chaos theory, and self-organization theories (Darrow, 2009) into a model explaining and predicting knowledge generation and learning in today's world. According to this theory, "learning is a process of connecting specialized nodes or information sources" (Siemens, 2004). In order to better understand how connectivists describe learning, one must understand the premise of network

behavior, which lies in the heart of the theory. A network can be defined as "connections between entities" (Siemens, 2004, Networks, Small Worlds, Weak Ties section, para 1). The simplest network is comprised of only two entities linked together. The entities of the network are called nodes and they arise out of the connection points that are found on a network. For connectivists, network nodes could be individuals, ideas, fields, groups of people, resources, and even communities. In fact, every learning community is described as a node that is always a part of a larger network. Nodes may be of varying size and strength depending on the concentration of information and the number of individuals who are navigating through that particular node (Downes, 2008). Interconnected nodes share resources and create an integrated whole. "Alterations within the network have ripple effects" on that particular network (Siemens, 2004, Networks, Small Worlds, Weak Ties section, para 1).

The concepts of network and network behavior are not new. Albert-László Barabási talks about the structure of the network and its "behaviour": "nodes always compete for connections because links represent survival in an interconnected world" (Barabási, 2002, p. 106). Frances Bell (2010) notes that the term 'connectivism' had previously been used when applying ideas from biological models of the brain to neural networks in machine learning, treating the neural network as part of a whole:

> The overall view that a strongly interconnected neural network and its firing patterns must be considered as part of a whole became an important principle of orientation in the study of the nervous system; it is referred to under the name of Connectivism" (Gestzi, 1990 as cited in Bell, 2010, p. 528).

Similar network behaviour can be observed within a personal learning network: certain nodes (ideas, communities, individuals) become more valuable than others. These "popular" nodes acquire more connections and are more successful at creating links with other nodes. Nodes with greater numbers of connections have greater chances of recognition, thus resulting in the cross-pollination of learning communities (Simens, 2004).

Learning and Knowledge According to Connectivism

According to Siemens, the process of learning is social, collaborative, and is connected with other activities. He stresses that unlike formal education, which tends to create an "artificial and structured" learning process, knowledge building is chaotic and messy (Simens, 2006b, p.27). Connectivists propose a radically new explanation of learning and knowledge. According to their theory, there is no "body of knowledge" being transferred from educator to learner and

there is no "single environment" for such a transfer. Instead, knowledge is distributed across an information network, can be stored in a variety of digital formats, and people's engagement with it constitutes learning (Kop, 2011). Knowledge within the network is seen as decentralized (Siemens, 2006b, p. 87). Connectivism proposes that knowledge is "too diverse and flows too rapidly to be held in the human mind" (Bell, 2010, p. 529). Within the connectivism theory, informal information exchange through networks becomes significant (Bessenyei, 2007). This exchange is supported by electronic tools and becomes a "continuous, lifelong system of network activities" (Bessenyei, 2007, p. 11).

Not just any kind of interaction with information would lead to a valuable learning process. According to connectivism, "successful" learning depends on four conditions: aggregation, relation, creation, and sharing. During the aggregation stage, the learner looks for access to knowledge and uses various sources - "resources to read, watch, or play" (Kop, 2011). This is the gathering stage during which information is being aggregated, often with the help of different technological tools. After reading, watching, and listening to the content, the learner goes through the relation stage – a process of reflecting and relating the newly acquired information to the previous experience. During the relation stage, new information is being absorbed, processed, and added to the existing knowledge. Creation is a crucially important part of the connectivist learning process. Learning is considered a knowledge creation process, not only as a process of knowledge consumption (Downes, 2006). Once the learner is able to "make sense" of the new information, he/she needs to manipulate this newly acquired knowledge and integrate it by creating something of his/her own. In the case of technology-enhanced learning, the third stage, creation, can lead to writing a new blog post, adding new references and links onto a social bookmarking sites, making a new entry in a discussion forum, etc. (Kop, 2011). In connectivism, it is equally important to share this work with others. As such, sharing becomes the fourth and final step of the successful learning process. In a technology-enhanced environment the sharing stage often naturally happens at the same time as creation, yet it remains an important and a separate aspect of the learning process. The connectivist learning is cyclical in nature. The learner will connect to a network to share and find new information, will modify his/her beliefs on the basis of new learning, and will then connect to a network to share these realizations and find new information once more (Downes, 2006). The learner also becomes an active participant in the creation of knowledge. Essentially, each person provides others with varied learning

experiences and the community as a whole becomes the curriculum and the classroom (Darrow, 2009).

A personal learning network is formed based on how connections to learning communities are organized by a learner. Learners may transverse networks through multiple knowledge domains. The peripheries of knowledge fields are porous, allowing for the interdisciplinary connections to be made. Siemens asserts: "the ability to see connections between fields, ideas, and concepts is a core skill" (Siemens, 2008, para 10). However, the learning process does not stop there. In today's world of ever-changing information, fully understanding a particular subject and the ability to learn more about that subject will change over time. It is no longer enough to accumulate and integrate new information. It has become equally crucial to be able to seek out current information and to filter that which is secondary. Simply put, "the capacity to know is more critical than what is actually known" (Siemens, 2008, para 10). The ability to make decisions based on new information that has been acquired is considered integral to the learning process.

To conclude: diversity of opinion is at the core of learning and knowledge generation for connectivists. The theory also stresses the importance of the "capacity to know" - ability to quickly and efficiently find information/knowledge in a fast-paced world (Siemens, 2004, Background section, para 8). Connectivism places emphasis the on ways of knowing and gaining knowledge, rather than the content. Furthermore, "learning is a network phenomenon, influenced and aided by socialization and technology" (Siemens, 2006a, Background section, para 5). For education this means individual, user-owned learning environments; a "shift from centralized, specialized, institutionally owned systems towards distributed, general-purpose, user-centered, and user-owned systems, such as social software tools" (Fini, 2009, p. 2). Siemens also stresses the importance of a contemporary look at learning: "static, context-less, content-centric approaches to knowing and understanding are fraught with likelihood of misunderstanding" (Siemens, 2006a, Background section, para 8).

Knowledge Building W.G. Perry Jr.

It is worth noting that while claiming to be a new learning theory, some premises of connectivism are far from new. Connectivism relies heavily on the "new" notion of knowledge fluidity (Downes, 2006; Simens, 2006a) however, researchers have previously proposed the ideas of the changing nature of knowledge. The origins of the knowledge fluidity theory can be traced

back to William G. Perry Jr. and his theory of cognitive growth in college students, developed in the 1960s.

The idea for Perry's study was introduced in 1953 when the Bureau of Study Counsel at Harvard College began documenting experiences of Harvard and Radcliffe undergraduates over their four years of study (Perry, 1970). Counselors were intrigued by the students' responses when confronted by relativism and notions of multiple frames of reference. Some students found these concepts "unintelligible" and displayed frustration while others "experienced a joyful sense of liberation" and "seemed to be in full exploration" of this mode of thinking (Perry, 1970, p. 4). The variety of ways in which students reacted to the pluralistic environment combined with the many ways they assimilated to this environment seemed rather unpredictable and chaotic. Perry and his colleagues speculated that "the pervasiveness and inescapability of the impact of relativism" was to be the development of the 20th century (Perry, 1970, p. 5). To fully understand and document students' changes in reaction to relativism, William G. Perry Jr. and his colleagues administered A Checklist of Educational Views (CLEV), devised in 1953, to 313 randomly selected freshmen at Harvard College (Perry, 1970). Some students were administered the checklist again at the end of their second year in college - the spring of 1955. To gain better insight into the complex process of idea assimilation and to better understand the changes in student views, researchers conducted interviews throughout May and June of 1955. After analyzing 98 tape-recorded interviews, they noticed that the students' reactions to the concepts of relativism and multitude of opinions were not as unpredictable as it had originally seemed. Researchers were able to detect "a common sequence of challenges to which each student addressed himself in his own particular way" (Perry, 1970, p. 8). The purpose of the study was then extended in order to obtain a larger sample of students and explain the sequence detected during original interviews. The study ran for several years, with 366 interviewees having been recorded by June of 1963 (Perry, 1970).

The analysis of these interviews gave rise to Perry's scheme of ethical and intellectual development, according to which a student goes through 9 stages/positions as a part of an educational journey (Perry, 1981). Although the theory was developed in one single academic setting, it could be applied to any educational environment and fits into the concept of a life-long learning. Perry's scheme is interesting not only because of the description of each stage but because of the special attention that is paid to the transitional processes; the routes a student takes

to move from one cognitive stage to the next. According to Perry, "the drama lived in the variety and ingenuity of the ways students found to move from a familiar pattern of meanings that had failed to a new vision that promised to make sense of their broadening experiences, while it also threatened them with unanticipated implications for their selfhood and their lives" (Perry, 1981, p. 78).

Perry's scheme consists of nine positions, each illustrated by a prominent thought of his students. Overall, nine positions are separated in three groups: Dualism modified, Relativism discovered, and Commitments in Relativism developed (Perry, 1981). The map of development (Figure 1) shows how students navigate through stages: from Dualism (all ideas are divided into Right and Wrong) to Multiplicity (stage in which diversity of opinions is being recognized by the student, however no judgment of opinions can be made, since no wrong exists), to Relativism (comparison and analysis of opinions and the context-specific nature of knowledge), to Commitment (choice and decision made). The map of development is not always completed in full and some students demonstrate a temporary delay in the process (Temporizing), while others end up abandoning the responsibility of choice making altogether (Escape) or avoid the complexity of Dualism by displaying hatred of otherness (Retreat) (Perry, 1981).

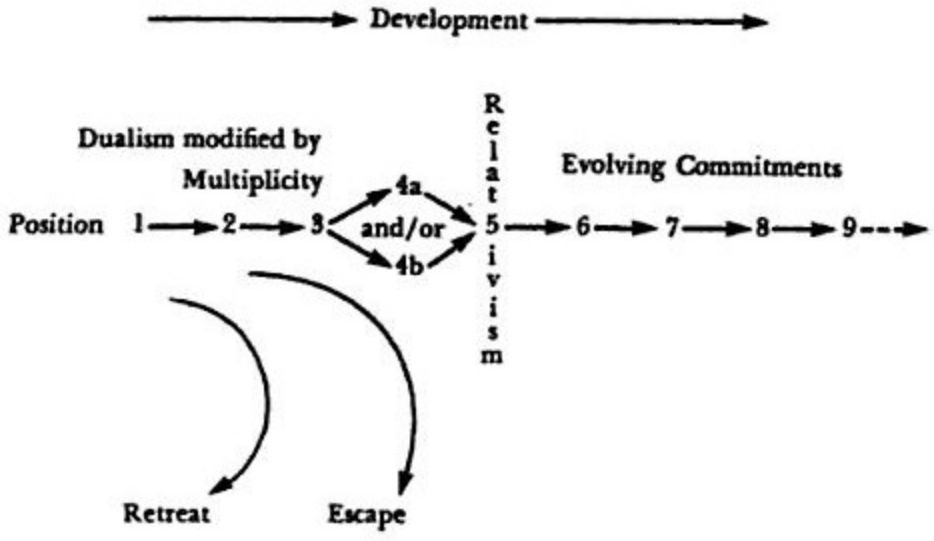

Figure 1 Perry's map of development. (Perry, 1981, p. 80)

During the interviews conducted by Perry and his colleagues, most of the first-year college students had a very black-and-white view of knowledge. Perry called this position "Basic

Duality". A prominent view of knowledge in this position was the idea of "Right Answers" existing for every question and authorities (teachers/instructors/specialists) teaching those answers. For students in this position, successful learning consisted of reading all assigned materials and solving practice problems assigned by the teacher. At this stage of ethical and intellectual development, students believed that doing "everything you are supposed to do" would guarantee that everything "will be all right" (Perry, 1981, p. 81). The first challenge to the position of Basic Duality would often come from an experience of diversity in the classroom. College students participating in the research were challenged by the opinions of others, their ways of living, as well as their different religious views. Such diversity became incongruent with the original Right/Wrong view of knowledge, making students feel defensive of their views and hostile to the opinions of others. Perry summarized this second position of Multiplicity Prelegitimate - following "True Authorities must be Right, the others are frauds. We remain Right. Others must be different and Wrong" (Perry, 1981, p. 79).

The second challenge to the student view of knowledge came from the authorities themselves. At a certain point during the education process, students were confronted with the idea that correct answers had to be searched rather than "given" (Perry, 1981). Students often felt confused and frustrated when teachers were unable to provide a correct answer, when teachers were uncertain of the "correctness" of the problem solution, and especially when teachers would mention that no right answer to the problem existed. Puzzled by this new discovery, students generally preferred disciplines where right, known answers persisted (ex. science). Soon, however, even science courses would show some level of "uncertainty" which lead students to the next position – Multiplicity Legitimate but Subordinate. At this stage, students viewed uncertainties as temporary while continuing to hold strong beliefs in The Truth and Right Answers to all the questions. The diversity of opinions would also be thought of as temporary, while also legitimate.

The transition between the third and the fourth stages in knowledge development was shown to be crucial. It was at this point that students realized uncertainty was no longer avoidable. In the classroom, this would manifest itself as "unfair" grading since the score no longer seemed to be proportional to the amount of work invested (Perry, 1981). Confused by the lack of Right Answers and discouraged by what seemed to be unfair grading, students struggled with a moral battle. The theme of dishonesty and unfairness among teachers came up in several

interviews. Perry noted that the attitude toward authority became essential at this point. Resentful students would often feel alienated or would revert back to the "simplistic dualism of Position 2" (Perry, 1981, p. 84), while students with less intense opposition to Authority would move forward to the next Position along the path of knowledge development. The change to Relativism, the next Position, could be reached by two different paths. Students following the first path would "preserve the fundamentally dualistic nature of earlier structures" (Perry, 1981, p. 84) by seeing the right/wrong worldview as part of a personal diversity. The best description of this position can be seen in Perry's article: "Everyone has a right to his own opinion […] Where Authorities do not know the Answer and any opinion is as good as any other" (Perry, 1981, p. 84). Students would show respect for the views of others but had yet to develop the capacity for meta-thought (Perry, 1981). Perry notes that at this stage, students were unable to compare the assumptions and processes of different ways of thinking. The second possible path, labeled Relativism Subordinate, happened when a student realized the complexity of certain opinions. People were no longer seen as holders of meaning, they instead became makers of meaning and students realized the existence of more than one approach to problems (Perry, 1981).

Both Multiplicity and Relativism Subordinate lead to the next position – Relativism. Transition from those stages happened in a slightly different way, but inevitably led to the discovery of meta-thought and irreducible uncertainty. Students were then ready to examine thoughts and no longer viewed theories as absolute truths. Instead, theories become models - "approximating the order of observed data or experience" (Perry, 1981, p. 88). The discovery of relativistic thinking often induced anxiety for students. Faced with a multitude of theories and no longer having Authorities to rely on, students would take it upon themselves to "learn the rules" (i.e. examine different opinions) of the theory. Perry notes the importance of internalization of the process - a sign of growth and maturity in the perception of knowledge.

Stage six of Perry's model – Commitment Foreseen – describes student realization of emerging Commitments. Commitments allowed students to focus on theories and ideas that would be relevant to their own life path. Students no longer felt comfortable with ideas being "handed down" to them by Authorities, instead they wanted to do their own research, analyze different theories, and have beliefs and Commitments that corresponded to their own views. Stages seven to nine describe the Evolution of Commitments. This is the point of action, when a

student might pick a set of values or a career, realize that simply having a Commitment does not solve all problems, pick other Commitments, and work on balancing them out (Perry, 1981). The process continues until a student eventually finds more contradictions and realizes that the process of Cognitive and Ethical Development does not stop. Instead, he/she must continue fighting for his/her values, while respecting others, being ready to learn, and continuously "retracing this whole journey over and over again" but hopefully more "wisely" (Perry, 1981, p. 79).

Perry's Ethical and Intellectual Development and Siemens' Knowledge Generation

More than 40 years later, in his 2005 article "Connectivism: Learning as Network-Creation" Siemens described the process of knowledge generation and learning from a connectivist point of view. At first glance it may seem that nodes, links, ties, and network behaviour have little to do with Perry's ideas, however network behaviour and network knowledge acquisition follow Perry's stages of cognitive development very closely. According to Siemens, learning occurs when "knowledge is transformed into something of meaning (and will then generally result in something that can be acted upon)" (Siemens, 2005, p.5). He describes the information system for network creation in the following way:

> Data – a raw element or small meaning neutral element
> Information – data with intelligence applied
> Knowledge – information in context and internalized
> Meaning – comprehension of the nuances, value, and implications of knowledge
> (Siemens, 2005, p.5)

Learning is a continuous process and is seen as an act of "encoding and organizing nodes to facilitate data, information, and knowledge flow" (Siemens, 2005, p.5). The process of connecting nodes becomes crucial to successful learning. In a messy and iterative learning process, nodes get reorganized and reconnected through a weakening of some links while creating and further strengthening others. Stronger connections could be formed due to factors such as motivation, emotions, exposure, pattering, logic, and experience (Siemens, 2005). This means that creation is another important part of a connectivist's learning process. An idle node will not contribute to the knowledge transfer. In order for a node to be successfully implemented in the existing network, it needs to be "encoded and connected to other elements of the network" (Siemens, 2005, p.9).

Experience is a common factor that plays an important role in the learning process both for Perry and all connectivists. According to Perry's research, the first cognitive changes occurred in students when they were exposed to a new experience - whether it was interacting with classmates who had different religious/ethical views, or finding that teachers (Authorities) were unable to answer a question. It was this experience that "moved" students from the position of Basic Duality into the next stage of Multiplicity Prelegitimate. Experience continued affecting the students' learning by stimulating changes in perception, cognition, and ways of thinking (Perry 1970, 1981).

Experience plays a similar role in network creation. Siemens states that most learning occurs outside of formal educational settings and experience serves as a "catalyst for both acquiring new nodes and forming connections between existing" ones (Siemens, 2005, p.8). Having the information is not enough to foster successful learning; a final step of connection forming happens when a learner gains some experience in his/her field. This echoes Perry's idea of a successful learning process in which a student shifts from being "a holder of meaning" to becoming "a maker of meaning" (Perry, 1981, p.87)

In both theories, new experiences may lead to a stage of confusion, which in turn can be followed by small adjustments to the knowledge system. Perry describes this as a movement from Multiplicity Legitimate – a subordinate stage to the Relativism stage discussed earlier. This is one of the most "painful" and difficult changes in the process (Perry, 1981). Connectivists explain this process through the network behavior. New information that is contradictory to the previous experience gets processed by the network and assimilated as a node. However, in order to protect its structure, the existing network "attempts to route around and push the new node to the fringe" (Siemens, 2005, p.13) preventing information flow through the node and thus weakening its connections. In order for the idea to be fully assimilated, the node needs to acquire a certain status.

Connectivists pay a lot of attention to the process of meaning creation. The observable meaning creation moments occur when a newly acquired node provides the missing connection and facilitates knowledge flow across the entire network. This is experienced when a new piece of information permits "connections between ideas and concepts that previously did not have connections with each other" (Siemens, 2005, p. 9). For Perry, meaning creation happens during transitions from one position to another. It is during these moments that a student experiences an

observable shift in his/her thinking patterns as a result of the new meaning acquired through experience.

Previous knowledge is another important part of a successful learning process. In his article, Siemens gives an easy-to-understand example of a book reading. If a reader can relate to the topic of the book, and if the ideas described in the book fit with the reader's viewpoints, the material will be absorbed quickly (Siemens, 2005, p. 10). Relating to Perry's model, this illustrates a student's experience in position 4b (Relativism Subordinate). The student whose previous knowledge and experience showed an ability to trust Authorities goes through a smoother transition into position five (Relativism) (Perry, 1981). Siemens refers to viewpoints as "context" and notes that it will greatly influence the speed and ease of knowledge acquisition, since acquiring new knowledge can no longer be seen as "a direct transference process" (Siemens, 2005, p. 10). Students are not passive consumers of information; they try to incorporate new ideas into the existing network (worldview/ideas/ways of thinking). This is why the learning process is different for all students. New information can be coded in various ways, depending on the existing network; just like Perry's students exposed to similar ideas in college had different ways of assimilating new information and went through different stages of the cognitive development map.

Connectivists see learning as a process which "first permits the capacity to receive knowledge, followed by encoding the knowledge as a node within our personal learning network" (Siemens, 2005, p. 11), which is very similar to Perry's students' perception of their own experience. Perry's students were faced with a multitude of worldviews and ideas at the beginning of their educational journey. They went through stages of confusion, but most of them were able to incorporate new concepts into their existing mode of thinking. Exploration of different approaches to the problems forced students to "think about thinking" (Perry, 1981). The breakthrough happened when a new way of thinking became part of the student's reality: "it took me quite a while to figure out that if I was going for something to believe in, it had to come from within me" said one of Perry's students (Perry, 1981, p. 92). Perry's students let go of some of their earlier ways of thinking just like some network nodes lose their strength and are no longer a part of the network over time. When this happens, a person might change their ideas and experience one of the transitions described by Perry. The process keeps going and both Perry and Siemens agree that learning is never-ending. For Perry it manifests as the repetition of stages,

while Siemens describes it as an adaptive property of the network: “Nodes within the network continually update themselves, accruing ongoing benefit to the entire structure” (Siemens, 2005, p. 14).

Criticism of connectivism

As a new theory, connectivism has received a lot of criticism. While it positions itself as a new theory of learning, not everyone agrees with this statement. According to Bill Kerr (2007), a new theory should be developed either to replace older, inferior ones or to build on previous theories to explain new developments that can no longer be explained. Connectivism does not fall into any of these categories: it cannot fully replace any of existing learning theories and it is unclear how or whether it incorporates any of the older, existing ones. Rita Kop and Adrian Hill (2008) look at connectivism as a “developmental theory”. The notion of “developmental theory” was introduced by Miller, who states that these types of theories are needed for the following reasons:

> To describe changes within one or several areas of behavior
> To describe changes in the relationships among several areas of behavior
> To explain the course of development that has been described in terms of the first two tasks (Miller, 1993, pp. 5-6).

In “Connectivism: Learning theory of the future or vestige of the past?” Kop and Hill (2008) investigate how connectivism fulfills the three tasks outlined above. They mention that the notion of network and node interactions implies changes in relationships between nodes (multiple individuals) involved in the learning process through discussion and feedback. Furthermore, the researches point out the far-reaching developmental implications of the definition of learning and knowledge proposed by connectivism. With the idea of learning spreading through the network, it can be said that maximum learning can best be achieved through identifying the properties of effective networks, which is precisely what Downes sets out to prove in his article “Learning networks and connective knowledge" (Kop& Hill, 2008). Yet, being mainly concerned with cognitive development, the connectivism theory does not concentrate on explaining how connections to networks may be interpreted in relation to physical maturation or the changes that occur over time with a person’s exposure to, and interaction with the social world. Without this further explanation, connectivism cannot be seen as a developmental theory. Furthermore, adopting a particular theory also means taking on a certain set of beliefs, looking at questions from a specific angle, and deciding on methods for studying

these questions. In other words, adopting a theory assumes a set of "rules of the game" (Miller, 1993). Connectivism does not yet fully extend its 'rules of the game' into philosophy or applied education, but it also cannot be disregarded as a training ground for further studies (Kop & Hill, 2008).

Unlike other learning theories, connectivism covers a larger scope by drawing from the fields of learning, education, philosophy of knowledge, and knowledge management. Bell (2011) agrees that the connectivist theory cannot replace existing learning theories as it is far too early to talk about it as a "free-standing" theory. Taking into consideration the broadness of connectivism and the transformative time of emerging technologies, she proposes that it be viewed only as a complementary theory. This proposition is in tune with idea of connectivism being an "epistemological framework for distributed knowledge which provides a strong philosophical basis for the connectivist learning framework" (Kop & Hill, 2008).

Kerr (2007) further challenges the view of connectivism as a learning theory by looking at several assertions made by connectivists. He agrees that the discussion about the nature of knowledge and the importance of different types of knowledge is necessary. However, connectivism as a learning theory only contributes to the discussion by stating that knowledge is changing so rapidly that it is only the source of the knowledge (the network) that remains important, and not than the actual content. Kerr (2007) affirms the need for more analysis into the concept of the knowledge half-life as well as the importance of knowledge. He argues that another problem with connectivism is that it fails to provide enough explanation about the inner workings of the networks. The theory is not broad enough to incorporate and explain the learning of "non universals" – things that are not learned spontaneously and include various subjects from reading and writing to democracy, from perspective drawing and agriculture to deductive abstract mathematics (Kerr, 2007).

Gredler is another critic of connectivism who, unlike Kerr, challenges the core of the theory. According to Gredler, connectivism does not follow the four constituent elements that must exist to qualify a theory as well constructed:

> clear assumptions and beliefs about the object of the theory should be highlighted;
> key terms should be clearly defined;
> there should be a developmental process, where principles are derived from assumptions;
> it should entail an explanation of "underlying psychological dynamics of events related to learning. (Gredler, 2005 as cited in Siemens, 2006a, p. 28)

Challenges of connectivism

In 2011, Rita Kop mentioned challenges posed by connectivism: the level of learner autonomy for connectivist learning, the need for critical literacies, the power relations on the network, and the level of presence. Bouchard (2011) defines learner autonomy as a mutli-dimensional concept that involves the exercise of learner-control in four areas: conative, algorithmic, semiotic, and economic. Conative dimension of autonomy is seen as motivation, personal involvement, and intentions to learn on the part of the student. Satisfaction one experiences from the process of learning is another important factor that falls into the conative area. Algorithmic dimension of autonomy includes setting learning goals, selecting necessary resources, choosing appropriate learning activities as well as defining the workload and methods of evaluation (Bouchard, 2011; Hrimech & Bouchard, 1998). Semiotic aspect of learner autonomy has to do with various formats of information (print, multi-media, hypertext) available to today's learner. Bouchard notes that the choice of the medium and its organizational form will "largely determine the quality of the learning experience" (Bouchard, 2011, p. 4). Finally, the economic aspect of learning autonomy is tied to the "value" of knowledge and learning, cost of education, and the recognition of accreditation. While not directly connected to pedagogy or learning process, this aspect is important in today's world of knowledge economy (Bouchard, 2011). The open nature of connectivism and its courses puts a fair amount of responsibility on the learner. A connectivist learner is often far removed from educational institutions and must learn independently. There is no "educator" who would be responsible for "providing information, organizing time, and structuring the learning activities and goals" (Kop, 2011, p. 21). Connectivism is thus criticized for putting the responsibility for these and other similar tasks on the learner's shoulders.

Besides autonomy, the learner should be digital literate in order to become a successful connectivist learner. The concept of literacy has been changing greatly over the time. More and more often the term "literacies" comes up in the literature. Alternatively, prefixes like "digital", "social", "technological", "visual", "information" and many others are being employed (Pegrum, 2010). The term "digital literacy" was first used by Paul Gilster in 1997 and referred to "the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers" (p. 1). While the debate about pluralization and prefacing of the term is beyond the scope of this research changes in the field of literacy signal the importance of

changing the approach to the subject within educational settings (Pegrum, 2010). In this day and age digital literacy is a complex subject that is surrounded by several myths. Terms like "digital natives", "digital generation", and "net generation" make one believe that today's youth feels at ease in the online environment and possess a high level of digital literacy (Prensky, 2001; Tapscott, 1998, 2009). This is not completely untrue. Studies demonstrated that digital natives are indeed heavy users of digital technologies with great knowledge about the area. However, generation of digital natives is not as uniform as one may think (Hague & Williamson, 2009; Pegrum, 2010). Various factors, including gender, geographic location, education level, race, and socioeconomic status influence people's access to technology (Hesper, 2008; Hockly, 2012; Pegrum, 2010). Personal preferences and inclinations play another important role in one's use or avoidance of technology (Pegrum, 2010). It would also be wrong to assume that generations prior to digital natives do not have a sufficient knowledge and ease of use of technology. In fact, many adults are comfortable with technological tools and are "far more technologically accomplished than many kids" (Pegrum, 2010, p. 2).Connectivism has been criticized for not addressing issues of access to technology, digital literacy, and the prevalence of the English language in online environment (Hamel, 2007; Inamorato dos Santos, 2008).

Another type of literacy necessary for a successful connectivist learning experience is critical literacy. Critical literacy is tied to assessing and filtering of information, as well as evaluating sources where this information comes from. Critical literacy has several facets. One of them - search literacy is an ability to "make the most of search engines, for example by using finely differentiated search terms, opting for visual displays, or seeking multimodal results" all while being aware of certain limitations of search engines (Pegrum, 2010, p. 4). Exposure to different information sources, different search engine, and careful evaluation of information are all parts of the critical digital literacy. One must learn to evaluate "the origins, authorship, history, accuracy, objectivity, completeness, currency and relevance of every digital document they encounter; they must learn to notice and see through slick graphic design; and they must learn to compare any given online source with other sources, online or offline" (Pegrum, 2010, p. 5). Critical filtering of information is also useful since there is just too much out there for one to access and to assess. Since there is no longer an educator who is present to guide and help in choosing, aggregating, and understanding information, the learner has to be able to validate information and/or find others who can help with these tasks (Kop, 2011). In order to find

information, learners need to understand the network structures, possess a high level of critical thinking abilities, and have access to, as well as an understanding of the Web.

The concept of "presence" provides yet another challenge to connectivist learning. Dron and Anderson (2007) outline the importance of presence and its links to engagement in the learning activities. This holds true for the presence of fellow learners as well as teachers. While a connectivist learning environment does not always have teachers present at all times, "knowledgeable others" would often play the role of teachers and mentors (Kop & Bouchard, 2011). Without this, a learner is left to seek out those "others" to get the support needed. Communication, collaboration, and the need for feedback and support are as important for a successful connectivist learner as for a "regular", classroom-based student (Kop & Bouchard, 2011).

In-depth discussion of whether the connectivist theory is indeed a new learning theory is beyond the scope of this research. However, it cannot be denied that connectivism raises a lot of questions that are important for education in a new technological age. It has started a serious discourse about learning in the digital age, new tools and educational design to support learners, and the future of a networked education.

MOOCs

What are MOOCs

Following the connectivism theory, a new type of course called a massive online open course (MOOC) has been developed. The term MOOC was "coined in response to Siemens and Downes's 2008 'Connectivism and Connective Knowledge' course" (Cormier & Siemens, 2010, p. 36). Although no "standard" definition of MOOC exists, it could be seen as an online event facilitated by an "expert" or "experts" in the domain. The report on MOOCs by McAuley, Stewart, Siemens, & Cormier (2010) defines MOOC as "an online course with the option of free and open registration, a publicly-shared curriculum, and open-ended outcomes", facilitated by "leading practitioners in the field of study" (p. 10). These courses integrate social networking and open, accessible online resources.

MOOCs are typically free of charge, although some learners may be required to pay an institution to receive credits it for participation (e.g. the first MOOC was created as a part of a regular course taught by George Siemens at Athabasca University). Following the framework of connectivism, the work within the course is shared between all participants. Online discussions,

sharing of readings and additional materials, and building of new content comprise an essential part of the course. Learning occurs through engagement with the course, with other participants, and with the distributed content. One of the biggest gains from participating in a MOOC is the network of connections formed between all the elements that make up the course (Chamberlin & Parish, 2011).

One of the main distinct characteristics of these courses is the size - MOOCs attract thousands of students who are simultaneously engaged in the course (Masters, 2011). Another distinguishing characteristic of a MOOC is its openness. MOOCs are usually free and open for anyone to participate. The software used by staff and students is open-source, the course curriculum is open or loosely structured, and changes as the course evolves. Other aspects of the course are open as well: the sources of information, the assessment processes (if they exist at all), and the learners who are open to a range of different learning environments (Masters, 2011).But MOOCs go one step further in their openness. Here is how Siemens describes it:

> In an open course, participants engage at different levels of the educator's practice, whether that be helping to develop a course or participating in the live action of the course itself. This is distinctly different from the idea of open in the open content movement, where open is used in the sense of being free from the intellectual property stipulations that restrict the use and reuse of content. The distinction between openness in practice and openness in content is significant in cost as well. Creating content requires time, effort, and resources and opens up numerous discussions around intellectual property rights. However, openness in practice requires little additional investment, since it essentially concerns transparency of already planned course activities on the part of the educator. (Cormier & Siemens, 2010)

In the open environment of a MOOC, educators are able to share and participate in the trials and successes of their fellow educators (Cormier & Siemens, 2010). This is made possible through online discussions, daily posts, and tweets. Furthermore, easy access to advancing technologies means that learners can now take control of where, when, how, what, and with whom they learn (Mackness, Mak, & Williams, 2009). Advancements in technology and the abundance of information allows for open-curriculum courses. Since content is readily available and searching for it has become easier, learners are able to participate in the creation of their own curriculum. The move away from standard class structures and toward a lifelong learning model also encourages this, since it allows learners with different interests and needs to create their own flavour of a course within the course they have chosen (Cormier & Siemens, 2010). Siemens

also notes that learners have become open to a variety of non-traditional learning models. They are now able, sometimes through the open access noted above and sometimes through access to other materials and guidance, to engage in their own learning outside of a classroom structure (Siemens, 2005). Although this has always been possible to some extent, today's learners have considerably wider access to content and more opportunities to engage online (Cormier & Siemens, 2010).

A typical MOOC is "created" by a small group of experts (usually 2-3 people) interested in the topic of the course. These facilitators are first and foremost in charge of the technical portion of the course and creating a webspace where the material will be stored. They are also involved in developing a course outline, organizing course topics, and inviting presenters. Although a typical MOOC is not as rigidly structured as a regular course, there is still quite a bit of preparation and organization that goes into it. Once all the legwork is done, facilitators send invitations and post announcements about the upcoming course. Most announcements are made via blog posts, Twitter, e-mail lists, and other social media tools (McAuley et al., 2010). Facilitators are also responsible for introducing the course and giving a summary of how things will work. They are usually the ones giving the first course presentation, introducing students to the idea of a MOOC, and explaining different aspects of the course. Throughout the term, facilitators send weekly emails with updates and schedules of upcoming talks. They monitor communications between the presenters and the audience during weekly "classes".

The weekly classes are each devoted to a particular topic. An email announcing the topic and providing links to readings is sent 3-4 days before the class. On the day of the class, students can listen to the presenter and watch the presented slideshow in real time. Some MOOCs employ videoconferencing and/or video presentations. In parallel with the presentation, there is a chat window, allowing students to communicate amongst themselves as well as with the presenters. There are neither weekly assignments nor homework, though students are encouraged to continue discussions outside the "in-class" chat environment. Writing blog posts, tweeting articles on the subject, commenting on other people's work, as well as engaging in online forums on the topic are all ways to create and contribute to the knowledge building in a MOOC.

Difference between MOOCs and traditional online courses

What makes a MOOC different from a "regular" online course? The first big difference between the two is the class size. Unlike a typical course, which is bound by the size of a

classroom, a MOOC online event is open to anyone and everyone, allowing hundreds and thousands of people to follow along with the course. In tune with the ideas of connectivism, these courses allow all people interested in the subject to build otherwise impossible connections. The openness of the course content is another significant difference between traditional online courses and MOOCs. MOOCs are typically not tied to any academic settings. Although some people register for MOOCs as a part of their university courses, most MOOC students "attend" the course simply because they are interested in the subject. Furthermore, the content of a MOOC is open to everyone – it is easy to browse through previous discussions and posts, listen to presentations, and download reading material. Since the Internet allows for keeping an unlimited amount of data available, the archives of the course can be viewed and used by those who were not able to "attend" the sessions while they were happening. The Internet also allows for real time communication between the attendees of the course, making MOOC presentations similar to in-class discussions.

One of the biggest differences of MOOCs from regular classroom courses is the student's "role" in the course. According to connectivism, "knowing" does not mean "having an answer" (Downes, 2006, 2008; Siemens, 2005, 2006a, 2006b). Instead, it is more important to know where to find information and have an efficient connection to it. The course does not only provide information, its main goal is to help students build their knowledge by making connections and creating knowledge platforms. In the digital world, this is being done through blog posts, online discussions, and tweets. The role of the teacher in the MOOC is also different from that of a traditional course. The teacher is no longer the only person creating and preparing material for the course. MOOC facilitators stress the importance of creating useful documentation, summaries, videos, and other material relevant to the course topic. Furthermore, the student is no longer required to go through all the content of the course. Although a typical MOOC would cover different aspects of the subject, some presentations might be more relevant to a particular student's interest than others. The student is encouraged to keep doing his/her own research on topics of personal interest, rather than listening to the content that would not be useful for him/her. Overall, MOOCs are developed with the idea of a student-centered, personally customized learning environment. As McAuley et al., (2010) put it: "MOOCs build on the engagement of learners who self-organize their participation according to learning goals, prior knowledge and skills, and common interests" (p. 10). Besides providing students with

factual knowledge, MOOCs allow them to design and build their own knowledge platforms. Over the duration of the course these personal platforms merge into group platforms – collections of knowledge tied together by one idea.

Difference between cMOOCs and xMOOCs

In 2015 it is impossible to talk about MOOCs without distinguishing the new classification of these courses: cMOOCs and xMOOCs. This separation of MOOCs happened in 2012 when a new type of massive open online course emerged. Although both types of MOOCs have similar titles, they are very different in setup, in underlined pedagogy, and even in goals. This thesis is about cMOOCs and the following chapters are fully dedicated to the description of these courses. This chapter, however, will discuss xMOOCs and some differences between the two types of courses.

In Fall 2011, Stanford University "opened" its Artificial Intelligence (AI) course by giving the opportunity to over 58 000 online participants from all over the world to follow it throughout the semester. This was possibly the first massive open online course of its kind. Although similar attempts existed before: e.g. Carnegie Mellon University offering free online courses through an Open Learning Initiative for almost a decade (Perez-Pena, 2012), though none were able to attract such a large number of participants. Around the same time, the Massachusetts Institute of Technology (MIT) announced a launch of MITx – an online learning initiative, offering MIT courses through an interactive learning platform (MIT launches online learning initiative, 2011). MITx was designed to

- organize and present course material to enable students to learn at their own pace
- feature interactivity, online laboratories and student-to-student communication
- allow for the individual assessment of any student's work and allow students who demonstrate their mastery of subjects to earn a certificate of completion awarded by MITx
- operate on an open-source, scalable software infrastructure in order to make it continuously improving and readily available to other educational institutions. (MIT launches online learning initiative, 2011)

In May 2012, MIT announced their new partnership with Harvard University and the creation of edX – a not-for-profit online enterprise designed to offer online courses specifically for interactive study via the Web (MIT and Harvard announce edX, 2012). Today, edX offers partnership with University of California Berkeley, The University of Texas System, McGill, Wellesley, Georgetown University, University of Toronto, Ecole Polytechnique Federale de

Lausanne, TUDelft, Australian National University, and RICE. Similar initiatives came from other universities: Johns Hopkins University, Kutztown University of Pennsylvania, TU Delft University of Technology, University of California Irvine, University of Colorado, University of Massachusetts Boston, University of Michigan, Utah State University, University of Southern Queensland, University of Washington, Yale University.

In 2012 Sebastian Thrun, one of the faculty members involved in the Stanford AI course founded Udacity – a commercial start-up designed to help universities offer MOOCs. In July 2012, Coursera – another for-profit xMOOC initiative was born. The goal of Coursera is to offer online courses from top universities to anyone, for free. By Fall 2012, Coursera claimed 1.4 million registrations (DeSantis, 2012; Lewin, 2012) and in March 2013 it partnered with over 60 Universities to offer courses in 5 different languages (English, Spanish, French, Chinese, and Italian). Similar initiatives have been created by different universities as well as organizations: AcademicEarth, ArsDigita University, Brigham Young, Capilano University, Dixie State OpenCourseware, Kaplan University, NPTEL, and Open University.

Although most of the aforementioned initiatives offer what seems to be a version of MOOCs, these new online courses, labeled xMOOCs, are quite different from original connectivist MOOCs. The pedagogy of cMOOC was based on the notions of connectivism and networking. Daniel (2012) describes cMOOCs intentions by quoting Ivan Illich: "educational system should 'provide all who want to learn with access to available resources at any time in their lives; empower all who want to share what they know to find those who want to learn it from them; and, finally furnish all who want to present an issue to the public with the opportunity to make their challenge known" (Illich, 1971 as cited by Daniel, 2012, What Is a MOOC section, para 7). From a student's perspective, a successful participation in a cMOOC means not only a passive consumption of knowledge, but also an active generation of knowledge and network building. cMOOCs encourage conversations, explorations, social knowledge building, and knowledge exposure via open online tools (Lane, 2012). These courses provide resources as well as content and highlight the importance of exploration and knowledge generation on the part of the learner. Gordon Lockhart (2013), one of participants in CCK11 mentions the importance of "togetherness" and collective learning: "Topics were explored together, connections made and groups were formed and maintained long after the MOOC was over. cMOOCs never die – I still check out the CCK11 page on Facebook".

New xMOOCs follow a more behaviourist approach (Daniel, 2012). In their pedagogy they are very similar to regular online courses. During a typical xMOOC, a weekly concise video lecture, shorter than the typical course video, is available for students as part of their in-class experience. Due to large numbers of students most of xMOOCs assessment is automatic with teacher role set as a content developer and presented (Knox, Bayne, Ross, MacLeod, & Sinclair, 2012; Martinlugton, 2012). These teachers have noted that the teaching experience in xMOOC environment varies greatly from a traditional classroom experience, comparing the former to delivering content to a camcorder (Ng, 2013). Recently xMOOCs shifted to put a greater emphasis on the assessment tools. Most evaluation practices have remained automated or peer-graded. In fact xMOOC organizations have encouraged professors and universities to build curriculum to support automated grading (Knox et al., 2012). xMOOCs offering credits for a successful completion of the course are required to include formal examinations proctored by third-party testing services (Moe, 2013). These examinations mirror traditional course exams designed to assess gained knowledge and test ones' understanding of the subject via multiple choice questions and equation solving problems (Cheal, 2013)

Unlike the personal, at times messy, and network style learning experience of cMOOCs, xMOOCs offer a more traditional, linear, instructor-guided learning. While a cMOOC is focused on user creation of knowledge, xMOOC's goal is absorption and understanding of fixed competencies (Martinlugton, 2012). xMOOCs do not rely as greatly on community and connective learning. According to Lane (2012), "content acquisition is more important in these classes than either networking or task completion, and they tend to use instructivist pedagogy" (para 5). Suifaijohnmak summarizes xMOOC experience in his blog post:

> xMOOC is based on the teaching model where the teacher teaches, and the students learn and consume the knowledge from the course, like watching the videos, or reading a book, an artifact, and be assessed on what has been taught or covered in the videos. … [It] is STILL based on the instructivist approach – which is based on behavioral/cognitivist learning theory, where the learners master the content, probably with the transfer of knowledge from one person or a number of persons (the professor(s)) or the machines (robot or virtual teacher), or information source to that of the learner. (Suifaijohnmak,2012, xMOOCs Are Based On The Flipping The Classroom Model section, para1)

While many cMOOC adherents are skeptical about the future of xMOOCs, several interesting initiatives have taken place. E-learning and Digital Cultures MOOC, known as EDCMOOC, was a five-week MOOC first offered via Coursera in January 2013. EDCMOOC is

often labeled as a hybrid kind of MOOC. Offered via a typical xMOOC platform, EDCMOOC followed connectivist ideas and pedagogy. Unlike a typical xMOOC taught via video lectures, EDCMOOC students were offered a weekly selection of resources that facilitated the engagement of students with the major themes of the course. Students were encouraged to use Coursera forum as well as their personal blogs and other forms of social media to initiate/continue discussions started "in class" (Knox, 2013). As part of the course students participated in live Google Hangouts, submitted their work for an image competition, handed in and peer-assessed a multimodal digital artefact for the final course assignment. Similar to cMOOCs, EDCMOOC encouraged learner-led knowledge acquisition and "the use of social media to build personal learning networks and communities of peers" (E-learning and digital cultures, n.d.).Course instructors (Sian Bayne, Jeremy Knox, Hamish A. Macleod, Jen Ross, and Christine Sinclair) encouraged students to explore the MOOC format by experimenting and discovering different aspects of MOOC learning. Following cMOOC principles, students created their own digital artifacts throughout the course. Over 42000 people participated in the first EDCMOOC (Knox, 2013). With over 20000 active participants the course generated huge amounts of course content, including discussion forum threads, blog posts, images, and videos. The content of this MOOC encouraged dialogue and reflection on the affordances of online education, in the best of the connectivist tradition (Knox, 2013). EDCMOOC is seen as a mixed or hybrid MOOC and might be the first of a new and exciting generation of massive open online courses.

Collaboration

3 Types of Interactions

In 1989 Michael Moore outlined the importance of a conceptual "distinction between three types of interaction" in distance education: learner-content interaction, learner-instructor interaction, and learner-learner interaction (Moore, 1989, p. 1). According to Moore, learner-content interaction is a defining characteristic of education, since "the process of intellectually interacting with content [...] results in changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind" (Moore, 1989, p. 1). This type of interaction leads to an internal, didactic conversation about the newly learned ideas and is thus essential for a successful assimilation of the new material (Moore, 1989). The instructional design of the content can facilitate learning through different means of material-presentation, instructions, explanations, and learning directions.

Learner-instructor interaction, the second aspect of distance education, is one of the highly desired forms of interaction by learners (Moore, 1989). It is important for instructors to not only select the content and plan the course but to maintain student interest, to motivate, to give students a chance to practice their new skills, and to manipulate information. Successful learner-instructor interaction also involves feedback, support, and encouragement. Moore mentioned that the extent and nature of learner-instructor interaction partially depends on the educational level of the learners.

The third form of interaction, labeled as learner-learner interaction is, according to Moore, “extremely valuable” and “essential” (Moore, 1989, p. 4). It is worth mentioning that in late 80’s, educational discourse was focused on the importance of student success in learning skills for group work and group interactions to later be able to function in society and the business world (Moore, 1989; Phillips, Santoro, & Kuehn, 1988). The goal of formal education was to prepare students for jobs. Moore notes that different age groups benefit differently from the learner-learner interactions. While younger learners find interaction with peers motivating and group exercises could serve as a way to simulate their real-life problems, older and more advanced learners can benefit from peer evaluation, criticism, group discussions, and group work analysis more effectively. In any distance education setting, learner-learner interaction is important because it "not only acknowledges and encourages the development of [students'] expertise but also tests it, and teaches important principles regarding the nature of knowledge and the role of the scholar as a maker of knowledge" (Moore, 1989, p. 5).

In 1999, Rourke, Anderson, Garrison, and Archer elaborated on Moore's ideas, proposing that the educational process consists of student interaction with content, an interaction between students and teachers, and an interaction amongst students. Later in 2000, Garrison, Anderson and Archer introduced their "conceptual framework" identifying these three crucial elements of a successful educational experience. According to Garrison’s model, referred to as the Community of Inquiry model, learning occurs through the interaction of the following core components: “cognitive presence, teaching presence, and social presence” shown in Figure 2. (Garrison et al., 2000, p. 88)

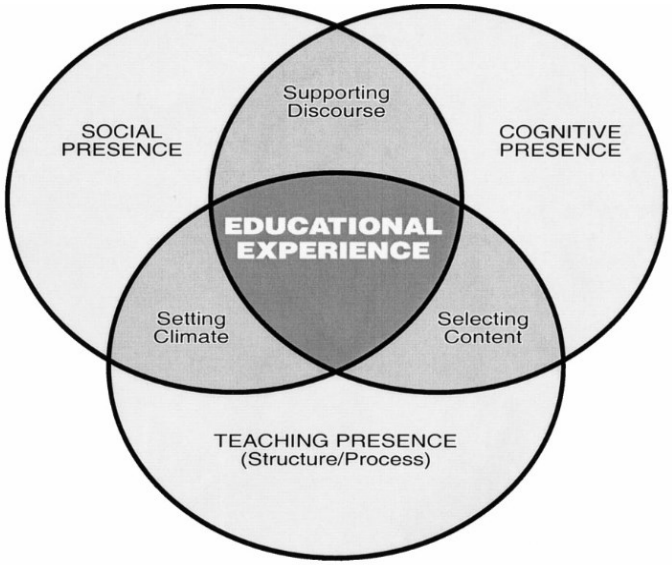

Figure 2. Elements of an educational experience. (Garrison et al., 2000 p. 88)

In this learning model, cognitive presence, defined as "the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (Garrison et al., 2000, p. 89), could be seen as an equivalent of the learner-content interaction proposed earlier by Moore. The teaching presence, which, according to authors, includes designing and managing learning sequences, providing subject matter expertise, and facilitating active learning, is the equivalent of the learner-teacher interaction in Moore's model (Rourke et al., 1999). While social presence could be seen as a learner-learner interaction of Moore, Rourke et al. (1999) define this third element as "the ability of learners to project themselves socially and emotionally in a community of inquiry" (Rourke et al., 1999 The Community of Inquiry Model section, para2). Successful social presence serves not only as a support of critical thinking, but makes group interactions engaging, intrinsically rewarding, and highly appealing to students. These properties of the social presence lead to "an increase in academic, social, and institutional integration, resulting in increased persistence and course completion" (Tinto, 1987 as cited by Rourke et al., 1999, The Community of Inquiry Model section, para 2). Although the original Community of Inquiry model was introduced for the computer-mediated communication in educational settings, it was later used to develop questionnaires and evaluation tools for online asynchronous education. Karen Swan (2001) applied Garrison's model to the concept of online learning. In her adjusted version of the model, Cognitive presence is represented by the course content, Teaching presence is replaced by the

interaction with the teacher, and Social presence is replaced by the interaction with fellow students. These three interactions are involved in and lead to a successful and satisfying learning experience.

All three types of interactions play an important role in MOOCs. An analysis done in 2013 by Terumi Miyazoe and Terry Anderson looked at 3 types of interactions: student-content, student -teacher, and student-student in cMOOC, xMOOC and sMOOC. sMOOCs are a smaller version (rarely over 50 students) of online open courses that use a social constructivism pedagogy, and are focused on team work, group interaction, debate, and collaboration (Miyazoe & Anderson, 2013). Results of this analysis showed that cMOOCs and sMOOCs had the highest levels of student-student interaction. While this level of interaction is somewhat expected for sMOOCs due to their social constructivist nature, student-student interaction within cMOOCs can be explained by the "emphasis upon opportunity" as well as the requirement for interaction as a part of network-building (Miyazoe & Anderson, 2013). Authors also found that student-student interaction was low to medium in xMOOCs.

Collaborative vs cooperative activities

Not every student-student interaction is an educational activity. In research literature, the concept of knowledge building among students by working together has been referred to as peer tutoring, peer learning, cooperative learning, collaborative learning, small-group learning, and many more (Nicolaou, 2009). In recent years, the discussion of "learning together" has been focused around collaborative and cooperative learning. The definition of collaborative learning has been debated by many researchers. The general consensus is that collaboration involves "a situation in which two or more people learn or attempt to learn something together" (Dillenbourg, 1999, p. 1). This description cannot serve as a definition, since each element (situation, two or more, learn something, together) can have various interpretations and definitions (Dillenbourg, 1999). Instead of trying to define collaboration, researches distinguish instead between collaborative and cooperative types of activities. Roschelle and Teasley (1995) explained that "cooperative work is accomplished by the division of labour among participants, as an activity where each person is responsible for a portion of the problem solving" whereas collaborative work involves "mutual engagement of participants in a coordinated effort to solve the problem together" (Roschelle & Teasley, 1995, p. 70). Thus it is the mutual engagement of learners rather than a simple incorporation of student work into the final product that makes the two types of

interactions different. Cooperative and collaborative instructional approaches can also be seen as appropriate for learners of different age groups. Younger students are often instructed using cooperative activities, while collaborative activities are more often seen in postsecondary education (Borokhovski et al., in preparation). The distinction between collaborative and cooperative learning is not always clear cut, for example Johnson and Johnson (1999) described certain processes and interactions as "cooperative" while they would be considered as collaborative by Roschelle and Teasley (Nicolaou, 2009). Despite the somewhat ambiguous distinction, it is the student-student interaction that lies at the heart of these activities, making them essential for a successful learning experience. Examples of collaborative/cooperative activities are: group assignments, debates, group discussions, group problem-solving tasks, group work on case studies, etc. (Nicolaou, 2009). Since the in-depth analysis of collaboration versus cooperation is beyond the scope of this thesis, for the purpose of discussion, these types of activities will be referred to as collaborative.

Importance of collaborative learning

Cooperative learning and more recently collaborative learning have been shown to increase student engagement, motivation, and self-esteem, to help develop students' cognitive and social skills, and to lead to higher student achievements (Johnson & Johnson, 1999, 2008). Other advantages of collaborative learning include, but are not limited to, deeper processing of information by students, fostering of reasoning and critical thinking, and encouragement of active and constructive learning (Brown & Palincsar, 1989). In 1989 Johnson and Johnson conducted a meta-analysis of research comparing the effects of collaborative, competitive, and individualistic learning. Analysis of over 700 studies has shown that collaborative learning resulted in higher productivity, greater achievement, better long-term retention of the learned material, greater critical thinking, meta-cognitive thinking, and higher-level reasoning (Johnson & Johnson, 1989). Students participating in collaborative learning were more willing to take on difficult tasks, demonstrated persistence in goal-achievement, as well as support toward their classmates. They possessed higher self-esteem, better social competence, a positive attitude toward the subject matter and tasks in hand, as well as greater satisfaction with overall learning (Johnson & Johnson, 1989). A meta-analysis of 158 studies conducted by Johnson, Johnson, and Stanne in 2000 was focused on the academic achievement of students. Analysis of the results of 158 studies showed that collaborative learning methods led to significantly higher academic

achievement as compared to competitive and individualistic learning. Researchers looked at eight different methods used in collaborative learning: student team achievement divisions, team game tournaments, learning together, group investigations, academic controversy, jigsaw, cooperative integrated reading and composition, and team assisted individualizations throughout different levels of education (elementary schools, middle schools, high schools, and post-secondary/adult learning settings). Despite the diversion of methods and settings, the results of higher academic achievements have been consistent, providing strong validation for the effectiveness of collaborative learning (Johnson, Johnson, & Stanne 2000).

In 2013 Kyndt, Raes, Lismont, Timmers, Cascallar, and Dochy addressed the issue of effectiveness of collaboration in education in a meta-analysis of 65 primary studies published since 1995 across subject matters and age levels. They found significant positive effects of cooperative learning in comparison with more traditional instructional conditions on achievement and attitude outcomes. The major findings by Kyndt et al. (2013) fall in line with the results of several previously conducted syntheses of research on collaborative learning (Bowen, 2000; Johnson & Johnson, 1989; Johnson et al., 2000; Springer, Stanne, & Donovan, 1999). Due to the overwhelming positive results of collaborative learning, it is now being used across teaching levels and subject matters (Stahl, 2004, 2006).

Collaboration in computer-mediated settings

Computer-supported collaborative learning (CSCL) is an area of research examining how collaborative activities can be supported by technology in order to enhance peer interaction and group work (Nicolaou, 2009). The role of technology in a successful CSCL environment is to mediate, support, and enhance collaborative processes. While CSCL can be one part of varied learning environments (face-to-face, blended, fully online) and varied learner interactions (synchronous, asynchronous), recent CSCL research has been mostly focused on online, asynchronous learning settings and has at times been referred to as online CL (Nicolaou, 2009).

Meta-analysis conducted by Bernard, Abrami, Borokhovski, Wade, Tamim, Surkes, and Bethel in 2009 examined different types of interactions (student-student, student-content, and student teacher) in distance education settings. Analysis of 74 effect sizes supported the overall positive influence of different types of interaction on learning achievements with specific emphasis on student-student interaction. A meta-analysis by Lou, Abrami, and d'Apollonia (2001) looked at the benefit of collaborative activities in computer-mediated settings. The

authors quantitatively synthesized results of 122 research studies looking at the effects group learning compared to individual learning when using computer technology. The results demonstrated that small group learning had significantly more positive effects than individual learning on student individual achievement and group task performance. Research has shown that collaborative activities have a positive effect on the learning process and student satisfaction within a course.

Collaborative knowledge building goes hand-in-hand with the main ideas of connectivism. As mentioned previously, according to connectivist theory, successful learning happens in four stages: aggregation, relation, creation, and sharing. The knowledge building process can be seen as a blend of individualized learning and collaboration (Mallon, 2013). The use of social networks facilitates collaboration, allowing "interdependence results in effective knowledge flow, enabling the personal understanding of the state of activities organizationally" (Siemens, 2004, para 6). MOOCs in general and specifically cMOOCs allow students to engage in different types of collaborative activities: synchronous (chats) and asynchronous (forums) discussions, group projects, collaborative work on wikis, and other activities. While facilitators of cMOOCs do not specifically tell students to work together, collaboration happens organically. In cMOOCs, discussion forums serve as an important part of collaborative knowledge building. Besides being a place for collaborative work, discussion forums create a feeling of "presence" - bringing students and facilitators together. The easy access and "free" structure of forums make it possible for participants to connect and have discussions that go beyond basic questions and concerns about course content.

Social Presence

What is Social Presence

In line with ideas of collaboration and cooperation is the theory of social presence. In computer-mediated settings, social presence refers to "the ability of participants in a community of inquiry to project themselves socially and emotionally, as 'real' people (i.e., their full personality), through the medium of communication being used" (Garrison et al., 2000, p. 94). The concept of social presence was first introduced by Short, Williams, and Christie (1976) and was defined as the "degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (Short et al., 1976, p. 65). Basing their work on Osgood's semantic differential technique, Short and his colleagues developed a method of

measuring one's perception of social presence through questionnaires (Short et al. 1976). They were exploring interactions between learners in face-to-face, audio, and closed-circuit television settings. According to the researchers, perceived social presence was based on the concepts of intimacy and immediacy (Short et al., 1976). Their research also showed that perceived social presence depended on the medium's ability to transmit verbal and nonverbal (gestures, facial expressions, posture) cues. The type of interaction served as another important aspect of the perception of social presence. Short et al. (1976) separated interactions into two groups. The first group, task-driven interaction, included peer assessments and responses to instructor-generated discussion topics. This type of interaction was directed toward problem solving, was often formal, and was controlled by the instructor (Crim, 2006). The second group, socio-emotional driven interaction, was directed toward relationships among learners and was largely self-generated (Crim, 2006). Task-driven interactions were shown to be associated with formal communication and a low degree of social presence (Argyle & Dean, 1965; Short et al. 1976). Alternatively, informal socio-emotional driven interactions included empathetic messages, personal notes, and self-disclosure (Adams, 2004; Cutler, 1996). Further research of socio-emotional driven interaction showed that this type of communication leads to establishing open and trustful relationships, increasing social presence, and providing a foundation for sharing information and building learning communities (Crim, 2006). Learning environments high in social presence provide "interpersonal warmth, friendliness, and satisfaction with the interaction" (Beuchot & Bullen, 2005, p. 68).

Characteristics of social presence

Intimacy, immediacy, and interactivity. Originally, studies of interpersonal communications identified "intimacy" and "immediacy" as main attributes of social presence (Argyle & Dean, 1965; Gunawardena & Zittle, 1997; Short et al., 1976). Derived from research by Argyle's and Dean (1965) indicators of intimacy include familiarity, empathy, trust, and concern. These intimacy indicators greatly depend on nonverbal factors such as physical distance, eye contact, tone of voice, and smiling. For example, an individual may permit another to stay closer to them or enter their personal space when a certain degree of intimacy is present (Crim, 2006). The levels of intimacy (i.e. gaze, physical proximity) that people adopt are partly derived from cultural norms (Argyle & Dean, 1965) as well as from a need for affiliation (Walther & Burgoon, 1992). Short et al. (1976) examined situations where certain nonverbal

information was missing (i.e. during a phone call) and speculated that language may be able to substitute the missing characteristics of intimacy. In their example of teleconferencing, participants modified their behaviour using verbal phrases rather than the more typical body gestures ("I agree" instead of a head-nod). The depth of self-disclosure between individuals during communication is another important indicator of intimacy (Crim, 2006). Increased disclosure of personal information characterizes a high level of trust and intimacy. According to Cutler (1996), disclosure of personal information causes reciprocation from others and leads to the individuals knowing more about each other and establishing trust, seeking support, and finding satisfaction through communication. Overall, a higher degree of intimacy supports self-disclosure, trust, and familiarity, which in turn leads to a greater perception of social presence.

Gunawarden and Zittle (1997) describe immediacy as a "measure of the psychological distance that a communicator puts between himself and the object of his/her communication" (p. 9). Immediacy is characterized by the ability to exchange information rapidly, the use of inclusive words (we, us, ours), the presence of personalized exchange, and individualized feedback (Christophel & Gorham, 1995). Other characteristics of immediacy include the use of praise and humour (Crim, 2006). In terms of behaviour, immediacy manifests itself via gesturing, vocal inflections, facial expressions, physical proximity, and time spent with someone (Crim, 2006). Both verbal and nonverbal immediacy behaviour can convey a sense of closeness and are generally connected to the notion of intimacy by their ability to create and maintain it.

Interpersonal communication in a computer-mediated environment gives rise to another characteristic of social presence called interactivity. Interactivity is viewed as a two-way communication between two or more persons, the purpose of which is to promote explanation and challenge perspectives among learners (Garrison, 1993). It is a potential quality of a communication and when realized, leads to a feeling of social presence (Crim, 2006). To summarize, a modern view of social presence includes intimacy (sense of close connection), immediacy (psychological distance), and interactivity (types of activities and communication styles). Together these qualities build a perception of "reality" in a computer-mediated environment.

Brownrigg's characteristics of social presence. In her research, Brownrigg (2002) identified five characteristics of social presence represented in an online environment: interactivity, mediated communication, immediacy, reciprocal awareness, and connectedness.

Interactivity is a crucial characteristic of social presence since the second cannot be present without the first (Brownrigg, 2002). However, interactivity alone cannot account for the sense of social presence. In computer-mediated educational settings, it is possible for a student to communicate with others without feeling connected to a group (Picciano, 2002). Mediated communication is another crucial characteristic since "all references of social presence [occur] within the context of mediated communication (as compared to direct, face-to-face communication)" (Brownrigg, 2002, p. 43). The notion of mediated communication has been changing over time. While Brownrigg's summarizes it within the context of text-based online education, mediated communication today happens not only in a text-based, but also in an audio and video- enhanced online environment. Immediacy was one of the original characteristics of social presence, introduced by Short et al., (1976) and is referred to as the psychological distance between interacting persons. It is connected to the use of nonverbal cues. While it was thought that social presence would be diminished in the case of communication mediated via mediums unable to project nonverbal cues, online communication has been shown to allow students to demonstrate immediacy via use of emoticons, capitalization of words, paralanguage, and more. (Anderson, Rourke, Garrison, & Archer, 2001; Rourke et al., 1999; Tu & Mclsaac, 2002). Nonverbal cues are not the only predictors of immediacy. Use of humour, frequent use of students' names, sharing of personal examples, and encouragement of discussions are other great ways of maintaining immediacy in a computer-mediated setting (Crim, 2006). Overall, nonverbal immediacy influences perceptions of comforting behavior, caring, and helps in building positive relationship between students as well as between instructors and students (Brownrigg, 2002). Reciprocal awareness is the fourth characteristic of social presence and can be described as the recognition of interactivity by all participants (Brownrigg, 2002). Active involvement in communication is an integral part of social presence (Whiteman, 2002). Reciprocal awareness creates an "essential" feeling that "others are there" (Cutler, 1995, p18). Connectedness is seen as the most recently defined characteristic, and is related to the level of social presence in communication within an online environment. It can be viewed as a sense of solidarity within a group (Rourke et al., 1999, p. 59), a sense of involvement, or of togetherness (Rovai, 2002). Connectedness leads to a feeling of trust and brings communication to a new, deeper, and more open level (Brownrigg, 2002). Rettie (2003) defines connectedness as a

"feeling of being in touch" - an emotional experience evoked by, but independent of, the presence of others. As a new characteristic, it is still being evaluated and discussed through research.

Importance of Social Presence

Social presence was seen as an important factor of communication and learning even before the research surrounding computer-mediated education. In 1996, Moore, Masterson, Christophel, and Shea examined the relationship between a teacher's immediacy behaviors and a student's rate of satisfaction throughout a course and found a significant correlation between the teacher's behavior, eye contact, immediate feedback, praise, and student's ratings. Verbal and nonverbal immediacy behaviours were found to be strong predictors of student interaction and lecture ratings. Immediacy behaviours were also linked to student motivation (Christophel & Gorham, 1995) and satisfaction with the course or instructor (Hackman & Walker, 1990; Richardson & Swan, 2003). In their study, Sanders and Wiseman (1990) looked at the relationship between teacher immediacy behaviour and their students' behavioural and cognitive learning. They found a significant positive correlation between the two.

Social presence plays an even more important role in online courses. The issue of isolation plays an important role in student satisfaction in an online course (Daugherty and Funke, 1998). A high degree of social presence increases interaction among students and instructor(s) and leads to a greater sense of community (Crim, 2006). Furthermore, increased social presence in an online course increases student satisfaction with that online course and can provoke an increase in perceived learning (Gunawardena & Zittle, 1997; Hackman & Walker, 1990; Han & Hill, 2007; Mykota & Duncan, 2007; Richardson & Swan, 2003; Sahin, 2007). Several studies have demonstrated positive correlations between social presence and student satisfaction with a particular course and instructor (Jung, Choi, Lim, & Leem, 2002; Picciano, 2002; Richardson & Swan, 2003). High levels of social presence in online courses were shown to result in deeper and more meaningful learning (Bibeau, 2001; Hackman & Walker, 1990; Rourke et al.,1999; Rovai, 2002). A study by Cheung, Hew, and Ling (2008) demonstrated that social presence can influence students' motivation and participation in an online course. Fostering a sense of presence increases participation in online courses, expands the depth of discussion, and improves collective learning. (Beuchot & Bullen, 2005)

Early studies of social presence in computer-mediated communication showed that the lack of social context cues and nonverbal cues could lead to impersonal communication, lowering

the level of social presence (Walther & Burgoon, 1992). It is not surprising that face-to-face communication has been proven to have the highest degree of social presence. Studies showed that clusters of nonverbal cues, known as immediacy behaviours, increase sensory closeness and foster support, warmth and interpersonal attraction (Anderson, 1979). In 1993, research done by Tuckey showed that lack of nonverbal cues in computer-mediated communication leads to a cold and unsociable exchange. However, further research demonstrated that the difference between face-to-face and computer-mediated communication diminishes over time. In their research, Walther and Burgoon (1992) found that as learners became more familiar with one another, immediacy and affection began to increase. Gunawardena (1995) demonstrated that despite the lack of nonverbal cues in computer-mediated environments, students "project themselves" online in order to manifest a social presence (p. 9).

Today's abounding variety of technological tools permitting online communication can permit a high level of social presence. This social presence may even be comparable to that of face-to-face communication (Anderson et al., 2001). While physical contact is not available in an online setting, students can often still develop a sense of belonging within a course (Picciano, 2002). This proves that immediacy and intimacy can be achieved without physical proximity. As was mentioned earlier, calling students by name, showing concern, providing feedback and praise, as well as referring to the learning community using a collective term such as "we" increases the sense of social presence amongst participants (Soong, Chan, Chua, & Loh, 2000). In a study performed by Arbaugh (2001), teacher immediacy behaviours such as humor, emoticons, audio/video clips, calling a student by name, and the use of personal examples positively correlated with student satisfaction within the chosen online MBA course. Students also perceived that they learned more from those instructors who had higher ratings of immediacy behaviours. Multiple studies have shown that it is possible to relay emotional behaviours associated with intimacy and immediacy using the text-based features of distance learning environments (Danchak, Walther, & Swan, 2001; Gunawardena & Zittle, 1997). Furthermore, today certain technological tools provide visual stream thus increasing the amount of nonverbal cues available to the learner.

Connecting with other in new social situations creates a degree of interpersonal contact, referred to as social presence (Gunawardena & Zittle, 1997). Online learning environments provide several challenges in facilitating interpersonal contact between all participants.

Electronic contact and isolated conditions further diminish the feel of social presence. Environments low in social presence are neither fulfilling nor successful for the learners and the instructors (Whiteman, 2002). Communication in such environments is impersonal with a low amount of shared information. While technology is often viewed as a culprit of low social presence new online tools, paired with innovative course design, and various collaborative activities increase social presence in online learning. Prompt feedback, used of inclusive words, sharing of personal details, and other similar techniques contribute to promoting social presence.

CHAPTER 3 –METHODOLOGY

PLENK2010

Data for this project was collected during PLENK2010, a cMOOC on the topic of personal learning environments, networks, and knowledge. The course was held over a 10-week period - from September 12th until November 20th, 2010. The course was organized by George Siemens, Steve Downes, and Rita Kop and was not associated with any institution. Following traditional cMOOC setup, participation in the course was free and open to everyone. The course had a total of 1641 active participants (Fournier, Kop, & Sitlia, 2011).

The content of PLENK2010 was divided into ten parts, and each week of the course was dedicated to a particular topic. Table 1 shows the summary of topics covered during the course.

Table 1

Topics of PLENK2010

Week	Topic
1	A tour of PLEs and PLNs – diagrams, discussions, examples
2	Contrasting personal learning with institutional learning
3	Understanding the next/eXtended web
4	PLE/PLN and learning theories
5	Evaluating Learning in PLE/Ns
6	Using PLEs successfully – skills, mindsets, and critical literacies
7	Tools – What exists, what is being build
8	PLE/Ns and personal knowledge management
9	PLE/Ns in the classtoom (PLE/Ns and blended learning)
10	Critical perspectives on PLE/PLN

Each day participants received a copy of "The Daily" – a daily course newsletter. Monday's issue of The Daily introduced the weekly topic, provided links to weekly readings, and contained information about two Elluminate sessions. The Daily also served as an aggregation tool, providing participants with links to blog posts, tweets, and other material tagged with #PLENK2010. Finally, The Daily featured descriptions of activities that participants were invited to complete.

Elluminate sessions, named after the software used, were teaching sessions led by course facilitators and/or invited guests. There were two Elluminate sessions each week - one on Wednesday and one on Friday. A guest speaker – an expert in the area of the weekly topic, usually led Wednesday sessions, while course facilitators coordinated the Friday sessions. The live Elluminate sessions allowed participants to not only listen to the instructor and view presented material (PowerPoint slides, screen shots), but also to interact with the presenter and other listeners by typing and/or speaking. Recorded copies of Elluminates sessions were available for all participants and contained all discussions to guarantee the fullest learning experience.

While the content of the course included a great number of articles, blog posts, videos, and other material, participants were not expected to read and follow everything. "PLENK2010 is an unusual course. It does not consist of a body of content you are supposed to remember. Rather, the learning in the course results from the activities you undertake, and will be different for each person" (How this course work, para 3). Participants were not expected to go over all the content. They were invited to "PICK AND CHOOSE content that looks interesting […] and was appropriate for" each of them (How this course work). In tune with the connectivist model, participants were expected to aggregate (choose relevant/interesting/important topics), remix (keep track of learning material via blogposts, discussion forums, online bookmarks), repurpose (create artifacts using tools/materials offered and/or found), and feed forward (share with others) the material.

The content of the course was distributed through various learning resources. An open source learning management system called Moodle was used as the course's main learning environment, providing structure and links to resources for learners. The Moodle course page was divided into 10 sections. Each section was labeled with the dates and topic covered during that week, and provided a link to a weekly discussion forum, weekly activities, and presentations. Each participant was free to participate in discussion forums by replying to existing threads or by creating his/her own. Apart from the weekly discussion forums, MOOC participants could also post in general discussions and talk about issues not necessarily relevant to any particular week. General discussion forums were dedicated to technical issues, questions, announcements, etc. Weekly discussion forums provided a place for participants to share their thoughts, link to their blog posts, and ask questions related to the course topic. These discussions got a lot of attention

from students as well as course facilitators. Table 2 summarizes total number of discussion threads and posts in PLENK2010.

Table 2

Number of discussion threads and posts in PLENK2010

Week	Number of discussions	Number of posts
1	28	576
2	36	549
3	14	173
4	21	269
5	9	143
6	9	130
7	11	314
8	6	117
9	5	70
10	12	200

Discussion forums were chosen as a data source for this project for several reasons. First, these forums served as a main place where all students were able to "connect". Unlike more disperse blog posts, blog comments, tweets, and other activities on various social platforms, discussion forums were easily accessible by all participants. Second, discussion forums were integrated into the course structure making it easy for students to locate the place relevant to the particular weekly topic. Another reason for focusing the research on the discussion forums was the fact that they are often found in various online learning environments and are not unique for connectivism. Best practices of online forum integration and the shortcomings of using this type of interactive tool can be transferred to xMOOC and online course designs. Finally, due to the nature of the study it would be impossible to analyze all sources of PLENK2010 interaction. Discussion forums were chosen as a manageable yet diverse data source.

Qualitative Content Analysis

Qualitative content analysis was used to analyze posts from weekly discussion forums. Since content analysis is a flexible method of analyzing textual data (Cavanagh, 1997) it was chosen as a tool for this research. One of the aspects of content analysis is the ability to gain a

deep understanding of the communication patterns and types of discussions at hand. It focuses on different characteristics of language with "attention to the content or contextual meaning of the text" (Hsieh & Shannon, 2005 p.1278). This approach allows researchers to examine the language of a communication in order to classify large amounts of text into manageable categories and represent various trends or meanings (Weber, 1990). This tool was chosen as an ideal method of analysis of dynamic and complex PLENK2010 discussion forums.

Qualitative content analysis has a long history in research, dating back to the 18th century (Hsieh & Shannon, 2005). Today, it is used in sociology, psychology, communication, journalism, education, health research, business research, and many other disciplines (Elo & H. Kyngäs, 2008). While original content analysis was used as either a qualitative or quantitative method of analysis, it has recently been primarily used with text data coded into explicit categories to be described using statistics (Hsieh & Shannon, 2005 p.1278). Qualitative content analysis is used for varied types of recorded communications, such as protocols of observations, interview transcripts, discourses, video tapes, etc. (Mayring, 2007). The goal of it is "to provide knowledge and understanding of the phenomenon under study" (Downe-Wamboldt, 1992, p. 314). This is done through a methodologically controlled analysis, following rules, and step-by-step models (Mayring, 2007).

During the initial stage of the qualitative content analysis, the researcher familiarizes him-/herself with the data through the reading of texts/scripts/interviews. It is important for the researcher to approach data without any pre-existing or preconceived categories and, instead, let them arise from the data (Mayring, 2007) naturally. This phase is often described as an inductive category development. The codes are first derived from the data by highlighting exact words from the text that allow the researcher to identify main thoughts and concepts (Miles & Huberman, 1994; Morgan, 1993). These codes are later organized into categories (Hsieh & Shannon, 2005). Depending on the complexity of the text and the relationships between these categories, they can further be organized into even larger categories. The definitions for subcategories, categories, and codes are then developed and any relationships between categories are identified and described (Hsieh & Shannon, 2005). This type of content analysis lets researchers gain direct information without being influenced by preconceived notions, theoretical perspectives, and/or categories (Hsieh & Shannon, 2005).

CHAPTER 4 - RESULTS

Following the method of qualitative content analysis, the first step allowed the investigator to familiarize herself with the data. Discussion forums of PLENK2010 had over 150 threads with a total of over 2000 posts. To save time, only ten discussion threads were picked at random for reading and initial pilot coding. This first reading led to the development of 6 categories:

- **Discussion**– posts about the topic of the week, questions relevant to the topic, ideas, and further questions about material covered.
- **General comment** – "thank you" posts, posts like "me too" or "agree". These posts did not add to the content of the course.
- **New content** – links to blog posts, documents, projects, or other types of artifacts created by participants as a part of the learning process.
- **Technical question** – problems and questions about the use of technological tools.
- **Technical difficulties with MOOC -** posts through which students voiced difficulties with the technical aspect of the MOOC. A separate general forum was set up for these types of posts, though some of them were still found in weekly discussions
- **Answers to technical questions -** answers to technical questions and solutions for technical difficulties within the MOOC.

It was not always possible to use one code per post. At times, one post would begin with a discussion of the weekly topic but have a link to a new document and/or a question about the use of technical tools. Whenever possible, the smallest number of codes was used to identify a particular post.

After the pilot coding, all threads were read and coded in a similar manner. During the full reading, new categories emerged and some categories were renamed. The new post categories included:

- **Personal experience** – description of experience outside of the course while still relevant to the weekly topic or the theme of the discussion.
- **Links** – links and references to articles, websites, and books not created by student (not new content).
- **New technological tools** – mentioning of technological tools used for teaching and/or PLE.

- **Info/remark** – unlike general comments, these short posts mentioned information relevant to the discussion (ex. reminder about an upcoming online event).

As a result of this review, two changes were made to the original codes: answers to technical questions category was renamed **know how** to include posts sharing technical knowledge with students about particular tools. Technical questions and technical difficulties with the MOOC were merged into one category. Table 3 illustrates the number of posts in each coded category.

Table 3

Initial numbers of posts in categories

Code category	Number of posts
Discussion	1097
General comment	342
New content	142
Technical questions	38
Know-how	50
Personal experience	351
Links	270
New technological tools	155
Info/remark	96

After the first round of reading, posts labeled as Discussion and Personal experience were re-read to get a better idea of the topics covered. The decision to select only those two groups of posts was not random. While other categories were very uniform and simple in the types of posts, discussion and personal experience categories were much broader. It was decided to separate them into subcategories in order to better understand the kinds of topics discussed by participants. The second reading also gave the chance to ensure consistency of coding. In fact, some posts were re-coded after the reading, which resulted in the following totals (Table 4). Most of the discussion posts were dedicated to weekly topics, though several other topics were brought up during the course of the MOOC. Some of the topics were mentioned once or twice, while others surfaced again and again throughout the ten weeks. The revisited topics included:

personal experience with MOOC, experience with technology and technological tools. For the total numbers of coded posts per week refer to Appendix A.

Table 4

Final numbers of Posts in Categories

TOPIC	# OF POSTS
Discussion	928
General comment	338
New content	147
Technical questions	55
Know-how	56
Personal experience	330
Links	289
New technological tools	157
Info/remark	126

Discussion Forums Topics

Personal Experience with MOOC

MOOC experience was the most popular topic of discussions throughout the whole course. Statements, complaints, and questions asked by students provided an invaluable insight into the experience of the massive online course. The forum format allowed students to share their ideas, respond to complains, discuss various ways of dealing with this new experience, build new knowledge, and have a sense of community and "presence" in an online class.

Initial shock: terminology, course structure, and jargon. The new and unusual format of the cMOOC paired together with an abundance of information provided as early as the first day of the course left students feeling lost and frustrated. During the first week several students voiced how overwhelmed they felt participating in the course. Students struggled to "keep up with the amount of information and discussion generated in [the] forum" and were asking when "the actual learning" would begin (w1t3). Used to detailed descriptions of learning objective and personal learning goals, some students felt frustrated not being able to rely on clear directions: "I find little information on how to manage the PLE as a learning experience" wrote

one of them (w1t3). Later during the same week (w1t23) another student, a MOOC newbie, started a discussion with the following statement: "I must admit […] to feeling very overwhelmed by the variety of locations of starting information". Just like the other student, she felt confused following the course without clear objectives. However, in her post she mentioned that pre-set ideas might have not helped her much: "Another part of my problem […] I was not clear what I was expecting, wanting, aiming for from the 'course'. Having a fixed idea would not have helped as I now see what I might get and how it too will evolve. Some focus would have been good though" (w1t23). She continued, comparing her feeling to "jumping into the sea" while forgetting to hold her breath. "Two days in, I am treading water and soon I hope to be swimming" (w1t23). Dealing with the initial shock of absorbing "a million bits /bytes" of new information proved to be very difficult for students (w2t2). Even after the first week students continued feeling overwhelmed. "I am so lost" wrote one of the MOOCers during the second week (w2t11). Despite being "over her head with the technology" she was not giving up and said that support and readings kept her going (w2t11).Finding connections between readings, tools, and artifacts presented yet another challenge. Several students shared their inability to fully grasp all the content of the course: "This course is so chaotic and open I take all directives lightly because I have no idea what is going on. There are so many discussions going on and I just sort of stumble across them" posted another MOOCer during the second week (w2t2).New to Web 2.0 student said that she was overwhelmed with terms like: "profiler, aggregation, scaffolds, iGoogle, MyYahoo!, ELGG, Flock, Wordpress, Web20Formula, StumbleUpon, Second Life, 43Things,43People" and had "absolutely no idea where to begin with any of it!" (w1t4).

It would be wrong to assume that only novice MOOCers felt intimidated by the structure of the course. A more experienced student, who had already set up a PLE, knew how to synthesize "information garnered from multiple locations on the internet", and felt that he was connected to various learning opportunities mentioned an occasional feeling of "overwhelement by options" (w1t4). Later during the course (w6t1), another non-beginner talked about his experience - while he escaped the lure of new tools and was not overwhelmed by the ambiguity of different aspects of the course, his prior experience could not protect him against "being rattled and challenged beyond a certain limit". Even half way through the course he kept battling certain challenges on a daily basis (w6t1).

Multiple sources of information and unusual open format of the course were not the only challenges that students faced. New words, abbreviations, and educational terminology provided additional obstacles to students. "A lot of the language and acronyms used in this course and most of the Internet tools are new for me" – wrote one student during the first week (w1t13). Another one complained about technological "jargon" that he and others were struggling with. He developed his thought by explaining that in UK older academics "were never exposed to formal pedagogy and the bad habits, preconceptions and prejudices we've learned, we've learned on the job! I have to confess it's been a while since I've had to use Google Define to understand a blog post!"(w2t2). During the same week another person voiced his complaint about the rather large amount of acronyms in the course and another participant repeated these thoughts several weeks later (w6t7), posting that computer/internet language and technical jargons can be overwhelming at times. The actual experience of the multitude of tools was causing some to "feel […] dive bombed by acronyms for the past two weeks" (w2t15). Lots of tools encountered during the first weeks were new and felt foreign. The same student shared her ways of dealing with all this new information: "While the discussions are generally absorbing, for me they represent the most confusing aspect of the course. I've tried following all discussions, however I've discovered this is counterproductive for me because it takes me off on too many tangents. From now on I'm concentrating on the posts that are directly related to the course content" (w2t15).

Even when the initial shock subsided MOOC experience remained an extremely popular topic of discussion. During the fourth week of the course (w4t1) one of the students began her post with the following questions:

> 1. I'm not sure I'm learning anything. What am I doing this for?
> 2. Is this really the most efficient & effective way for ME to learn about PLEs, PLNs? My "free time" is severally constrained. Wouldn't I rather be doing something else right now?
> 3. I wanted to figure out what a MOOC is. So, after three weeks, I figured it out. Is it for me? Hmm...not sure.
> 4. I tried blogging, I tried the discussion forum, I tried Twitter..none of it is really working well. I'm not really engaged in conversations with fellow participants. It's more of a random response to a post or tweet and I move on. I don't have the time/energy to track down who has posted responses to my posts (am I supposed to feel guilty about that?).

The main reason that kept her "in the game" was finding her own way of managing all the incoming information by ignoring some of the suggested reading and finding questions on the discussion boards that were addressed directly to her. She found it extremely encouraging and

felt that facilitators could use this time and the technique to encourage the participation of the remaining “students”.

Not everyone found the initial information shock unpleasant. Several MOOCers felt that it was actually beneficial for learning. “It's still frustrating but I do see the utility of being frustrated” said one of them (w2t2).During the same discussion (w2t2) another student brought to attention the fact that not everyone under the age of 30 was “a computer whiz” and that he was intimidated by his helplessness and would not wish this feeling unto his students. His statement was received with a contradiction from another participant mentioning the fact that all her “biggest learning moments” came out of the unpleasant, overwhelming, and intimidating experiences. To her these deep reactions meant personal interest and importance. After all, one would not feel nervous towards topics that are unimportant (w2t2). Her thought was further developed by one of the course facilitators. He, in turn, believed that the fake security of a “neatly packaged construct of a course” could not lead to learning. He encouraged the feeling of discomfort, since learning was a messy and chaotic process of connecting and decision making and while in the past, “[e]ducation has been too focused on making the learning process one that is sanitized. […] Educators should encourage complexification, not simplification”. Sometime later during the same week (w2t15) a student agreed with this position: "Oftentimes I've found that there's a high correlation between the degree of initial shock and ultimate transformation". Similar ideas were raised later during the course (w6t7) by one of participants who mentioned that he expected to be challenged by MOOC experience and did not give up despite the fact that at times he had to “play catch-up” and “experiment with ideas”. He was happy to embrace all the challenges and was grateful to the introduction of new tools. Without the MOOC he would not have started using Twitter and his blog as educational tools.

Time. Lack of free time for the course was another common "complain" voiced over and over in the discussion forums: “this form of learning takes a lot of time […] and until you learn how to filter and organize the information and focus on things that will help you reach your personal learning goals, you will feel very frustrated by the time you are spending and by your increasing awareness of what you don't know!” (w6t7). “We're all 'time poor'” said another MOOCer who had to juggle her three-days-per-week teaching, two projects, and multiple MOOC-related activities: reading suggested resources, familiarizing herself with new applications, searching through and reading forums and blog posts, as well as maintaining her

own blog (w2t15). During week 4 one student mentioned his constant state of "playing catch-up with PLENK" that prevented his from being more active during the discussions: "I'm about 2 weeks behind […] I feel I'm one of the silent members of the PLENK course precisely because of this lagging behind. I'm reluctant to post to discussions that seemed to have ended two weeks previously"(w4t1). Another student (w4t1) compared cultivating a useful PLE/N to gardening, which requires "a lot of time, discipline, and patience to get good results". Lack of time prevented some students from actively participating and contributing to MOOC. "[I]could have been in a better place to contribute […] if [I] had spent more time on the design and development of PLE and PLN in earlier weeks" posted one MOOCer (w4t1). Another one wrote that due to the lack of time he felt like he had "more of a shape of a PLE rather than a sufficiently developed one" (w4t1). Lack of time was also one of the reasons for not being efficient and successful in the course: "But how do I learn what I want to about these tools as efficiently as possible?" asked one of the students (w5t3).She felt that there was not enough time to "use a variety of new and apparently useful Internet tools" (w5t3).

Since most of the course participants were teachers/educators having other commitments and jobs prevented them from fully immersing into the MOOC experience. During the second week of the course one student mentioned that her teaching term was restarting and she was fully aware that her free time would be consequently reduced (w2t2). Another participant shared her experience: "Between this and the committee that got me involved in this, I am simply overwhelmed. I try to grab as much as I can in limited amounts of time. A lot of times I just bookmark things and make notes to go back later" (w2t2). Similar thoughts were brought up during week 5: "I feel that this course could consume every waking moment...there are so many readings, forums, Ellumiate Live sessions...and I am locating other interesting/relevant links as I go...but so much of it is new, and although I am getting the gist, I just don't have the time needed to explore all of the tools, websites, and blogs I am finding" (w5t3). Aggregation and filtering of all sources of information was a time consuming process on its own. With the wide range of possible learning places a lot of time was spent on going through material that had no meaning nor were they interesting for participants (w5t3).

Finally the "participation" part for MOOC was also time-consuming. Several students mentioned that replying to comments and conversations in forums was taking them longer than expected: "the quality of the people in this course make me want to write my very best, so it takes

a long time to tweak my replies to be clear and accurate, and then they still look a bit pale […] In this MOOC I struggle with choosing between "I-ought-to-be-contributing" and "I-could-read-10-complete-forums-while-I-make-one-reply" (w2t10). Later during the course (w6t1) another student shared his experience: "...it takes a longer time to read and write a conversation than it does to chat about it […] Feedback, if any is after the fact and may have little if any relevance [...]All the dead non-engaged time in between can contribute to "complexity", fragmentation and discontinuity".

Ways of dealing with the course content. As the course continued more students agreed that the only way of dealing with the mountain of information in the MOOC was to choose relevant and interesting topics. Discussion forums allowed participants to share tips on excelling in a MOOC environment. By the end of the first week students were sharing some of the techniques they have adopted to deal with the scope of information: "I am feeling a little less overwhelmed today because I came to some conclusions" – wrote one of the participants - "I cannot and do not have to get all of this. I have a limited amount of time and a limited number of brain cells. I must remind myself that I am not getting a grade for this. It is just an opportunity to learn some stuff. If I can master one or two new things to add to what is becoming my PLN or PLE, this will be a useful experience" (w1t26). Similar solution was found by another person; early in the second week he understood that processing all the information was impossible and futile. His reader and twitter provided more distraction than help so he chose to focus on one topic at a time: "Today, I concentrated on getting a handle on concept maps. Tomorrow, I may have time for a reading or two before the Elluminate session" (w2t2).A MOOC novice, not used to learning outside of formal classes, shared her way of dealing with the copious amount of information and lack of clear direction. To stay afloat in the course she would "focus and refocus on specific learning goals once in a while", pick and drop topics of interest without "feeling guilty" while keeping focus (w1t23). As participants were finding new ways of "dealing" with the MOOC experience the theme of choosing only relevant information was repeated by several students. One of them, a "true novice" followed the guidelines of the MOOC and decided not to get involved into everything at once. Instead, she found her own way of navigating through the course: "… my entry point would be with The Daily and the Forum discussion. From that I have selected this thread and [another one] to follow" (w1t23). Similarly, one of more experienced MOOCers gave suggestions to his classmate (w2t2): "pick up the topics from the discussion

boards. You see a heading that doesn't interest you? Move on to something that does. […] If you're feeling lost, then use the Daily as a guide. […] Start with [required readings] to get a grasp of what is going to be discussed for that week. […] For each contribution, simply read the heading; if vaguely interested, read the blurb that follows. If really interested, click on the link, and go for it - otherwise ignore and move on. […]Look at the bulletin boards (forums) - select those with headings that interest you. From there on, create and respond as you would like - and just grow with it".

Experience sharing. Sometimes a simple act of writing about the MOOC experience leads to interesting and useful feedback. During the fifth week one of the students started a discussion by asking whether she was the only one still feeling lost and overwhelmed. She felt that her lack of experience with social media and tools used during the course prevented her from progressing, despite her motivation and desire to learn. She also mentioned that she needed "much more explicit instruction and fewer choices" and that she was not prepared for "the wealth of possible reading and writing options and all of the new vocabulary and conceptual representations" (w5t3). She received lots of suggestions and several comments showed that she was definitely not the only one still feeling overwhelmed. One of the suggestions was to find an appropriate filtering system. Similarly to traditional education where one uses books or relies on teachers for information filtering, MOOC learning could not be accomplished without some sort of information separation. "Presenting in a useful way is important, but choosing what information students should understand is also a necessary role of teachers" (w5t3). Later in the discussion she agreed that a filtering system was what she needed. She was grateful to others for guiding her through first experiences with different technological tools, for advice and support, and for explanations. The sense of information overload did not leave her but she felt that she was on the right track and was learning how to pick and choose the content that interested her (w5t3).

During the same week another student reflected on his experience with the MOOC. He talked about his share of ups and downs throughout the first half of the course: "My postings on the subject range from mad euphoria to deep despair and even paranoia!" (w5t3).Unlike many novice MOOCers he was excited to learn about new tools: "I like shiny new toys and Web 2.0 is full of them! So I didn't have much trouble building a PLE or working out how to use it to create a PLN" (w5t3). However, not having a plan and trying to "consume everything" led to aimless wandering rather than efficient learning. He admitted to using familiar tools rather than learning

new ones, “making Wordles of the readings rather than reading them”. By the middle of the course he chose to refine his plans and have actual learning goals for the course. He was not the only one to mention “playing with tools” rather than learning how to use them. During the seventh week another student confessed in not having “adequate knowledge about how to improve the functionality” of newly learned tools - one of suggested tasks for the weekly assignment. He felt unprepared, agreed to being a “mere user of the tools”, and needing assistance when things did not work (w7t10). While learning new tools was exciting for some, others found the task daunting and felt frustrated. “Learning 5 or 6 new tools on their own” did not make them happy (w6t1).In a different discussion during the sixth week another person concluded that he needed time to eavesdrop, to lurk, and to experiment with ideas. He felt that the course had been a steep learning curve but he felt more comfortable than six weeks before (w6t7).

Communication with facilitators. Discussion forums also provided a way for students to communicate with the course facilitators and invited speakers. During the first week a whole discussion thread was dedicated to students' questions to the author of one of the articles presented in the course (w1t9). While there were only 23 posts in the thread several students got a chance to ask questions and clarify certain ideas brought up in the reading and get a better understanding of the topic.

On more than one occasions students asked facilitators to clarify certain issues and/or to share their opinions. The posts ranged from questions and suggestions like: "I was wondering about the facilitators/mediators/trainers/teachers showing us what they think, and so far it would seem that they are mostly showing us the path rather than the destination" (w2t2) and "I wonder if the teachers shouldn't help identify the consensus/conclusions more explicitly?" (w2t2) to disappointment and even frustration: "I felt, that since 6th week the facilitators could not handle the situation any more. For me, the enjoyment of participating stopped there" (w10t1). Facilitators tried their best to answer all the questions directed to them. One of them wrote the following as a response to students' frustration: "I think the facilitators (and I can only speak for myself) had the same problem as other participants: the level of attention and involvement given in the first five weeks of the course was impossible to keep up. ... I moved my attention to the Elluminate sessions and Twitter and kept my weekly blog posts up" (w10t1).

Online communication. Online communication, specifically on discussion forums, was a big part of MOOC experience. "I'm finding that the discussion board is becoming the centre of the course for me" said one of the students at the beginning of the course (w2t2). Same week (w2t10) this statement was echoed and built upon by another participant who mentioned that communication was crucial for a networked environment. She also mentioned that fostering a successful communication on the discussion boards can be challenging but is important to keep those discussions going. Several other students agreed, mentioning presence and community development as an important part of the networked learning. Sharing his personal experience, one of participants, who has been using discussion boards in his teaching practice, mentioned that it usually takes "about four to five weeks of modeling and explicit instruction to foster substantive communication amongst students (w2t10)". Over the course of ten weeks students continued participating in discussion forums. In fact, by the 8th week, when the participation dropped down and forums became a bit less active one of the students wrote the following: "I've been staring at this discussion forum all week, waiting for something to happen. Has some form of forum-fatigue set in? I can't wait any longer, I must post something....even if it is just rambling...." (w8t5).

Hearing "voices" of others and having a sense of community was important for most participants. In the beginning of the course (w2t15) this concern was mentioned by one of the students: "There is something different about a PLE than the real world […]. In the real world meetings are scheduled or at least there is an implicit acceptance that a conversation is taking place. That has an impact on communication. Here, in cyberspace I don't know if anyone is listening and even if they are, I don't know if my future self will listen for a reply. […]I am worried that alienation in this environment is real and not something to be poo-pooed by veteran MOOCsters". Understanding others and hearing their voices was important for another student who wrote that it helped her to "understand the personality, motivation and ethics of the speaker behind the voice i.e. the individual link in the network chain" and to know that there were other "humans" within the network (w6t1). Same student noted later that this type of online communication helped her to find openness, "transparency of intent", and empathy (w8t5). She felt that she could trust most of the fellow students and greatly enjoy humorous messages as well.

Another important aspect of online communication - confidence and online "voice" - was brought up several times during discussions. When messages went unanswered some students

felt frustrated, not listened to, and even left out. Unlike a real crowd of people where one could simply start a conversation with a person standing near, “mingling and participating” was not always as easy in online settings (w2t15). A similar idea was brought up by another student during week five. At the beginning, she found the course “very user-friendly...using Moodle and Elluminate Live were gentle experiences - with lots of repeated support. The Daily is a gentle reminder that there is an opportunity to engage and the links are provided to me again and again (w5t3)”. However her experience with forums was discouraging. After trying to enter into eight different conversations she felt that she was being shut down rather than welcomed into a dialogue (w5t3). And she was not alone feeling left out; in the same discussion thread another MOOCer wrote that he was feeling discouraged at a certain point. Things changed when due to some personal commitments he had to stay away from MOOC forum for several days. After he got back he saw several responses. “I was pleased, […] now I feel a bit more included” (w5t3).

Not everyone needed responses from "classmates" to feel like they were learning. Some students felt comfortable learning on their own, absorbing information from a variety of sources, processing it, taking time so it became their “knowledge construct”. This is how one of the students described her learning. Only after feeling comfortable with the idea and feeling that she had something to say, she would participate (w2t15). Not talking did not mean that she was not learning and she did not feel excluded by not writing. She also mentioned the “right frame of mind” that one might have before “spreading oneself out on the board signifying permission to be dissected” (w2t15). Several MOOCers agreed that at times they did not feel comfortable enough to contribute to the discussion. The tone of the online "talk" was a significant discouraging factor for them - making them feel pinned down rather than free (w2t15). When the issue of "no responses" was brought back in a different discussion most students agreed that the lack of responses was not usually a personal factor. Packed schedules, different learning styles, and even personality traits were mentioned as possible reasons for the silence (w5t3). However, for some, “no reply” was equal to “not important”. “How do we decide what matters when there’s no reply. Isn’t that how social animals determine “mattering”, by whether it elicits a reply, initiates further conversation?" (w5t3)The short format of discussion forums was also mentioned as the reason for the polarized, “difficult to get into” discourse (w5t3). “We all have more to say than can conveniently be written in a readably small space, so we have to leave out a lot of nuance” proposed one of the students during the sixth week (s6t1). He developed his argument by

proposing to "stop thinking of ourselves as all-knowing and writing the seminal textbook, but as collaborators […] each contributing a few paragraphs to the book. This partial letting go of control can be tough for educators not used to the paradigm, but is necessary if we are to harness the power of collective learning" (w6t1).

Asking for the help turned out to be one of the ways of getting responses and being included in the discussion. "Since I posted my rant, I have had so many compassionate and helpful replies...and from people who sound like they understand and sincerely want to help. The humanity that was invisible to me, has become apparent! I am encouraged to keep on learning …" said one of the participants (w5t3). Another MOOCer felt that commenting on blogs rather than participating in the discussion forum led to a more meaningful personal contact and a stronger sense of community (w5t3). Another obstacle for coherent and centralized communication, as mentioned by one of the participants, was the "PLE's dispersion" (w5t3). He said that despite feeling comfortable with and having experience in the online communication, connecting in this particular course was difficult for him. With PLENK2010 artifacts spread all over different platforms, finding "your own crowd" was a real challenge (w5t3).

Yet, finding one's voice and speaking up was not always easy: "I too find it particularly hard to find my voice in an open dialog. As an introvert, I struggle with doing anything more than applauding" (w2t15) mentioned one of the students. She developed her though by saying that she felt no need to say things out in order to learn and that constructing her posts and blogposts took her quite a bit of time. She struggled to be more "sociable" online and hoped that the participation in MOOC would help her (w2t15). Another student had a different view and felt that she needed to voice certain ideas in order to contribute to the collaborative effort (w2t15). However she was not expecting any response or feedback in return, believing sharing to be "the only critical element, behavior, or factor in an open world" of MOOC (w2t15). While yet another person mentioned that the participation was one's responsibility and it was especially difficult for her to start a conversation with others since English was not her native language (w5t5).

Lurking. Why did some students contribute to the discussion while others stayed silent through most of the course? The issue of lurking in MOOCs was one of the recurrent topics of the discussion. Several people talked about their lurking experience throughout the course. Lurkers were also given a special opportunity to enter the discussion during the last week of

MOOC (w10t1). "Too much reading", the “high-brow” attitude, technical difficulties, the lack of time, the desire to listen to the experts, discussions that were above the needs, the dispersion of the course, the time needed to digest information and to formulate a response, the unstructured nature of discussions, and the low energy level of the course were mentioned as the reasons for lurking. As early as the first week of the course one of MOOCers confessed that she has been lurking and was feeling somewhat guilty about it (w1t4). Being new to the web 2.0 she felt intimidated by all the new tools and preferred lurking to active participation, despite the guilt feeling. Besides the intimidation over the technology she also mentioned a “degree of mistrust” as a reason for her quietness (w1t4). Before participating in the MOOC she thought online social networks being a fad but her curiosity about different applications of technological tools and the usefulness of social networking for building knowledge gave her some confidence. She concluded her post saying that her lurking activity as well as her learning would continue (w1t4). The knowledge level and the culture of the network were mentioned as reasons for lurking by another student in the same thread (w1t4). “I'm not sure its guilt or lack of confidence I think it's more like trying to figure out a new culture when we enter a new network. What are the norms - can I ask questions or are you expected to always read the fine manual” (w1t4). Three weeks later, the topic of lurking was brought up again. One of the MOOCers suggested that silent participants might not know how to “get involved in the course” and might doubt their ability of bringing anything new into it (w4t1). He has been lurking before and admitted that hesitation and lurking, or “gleaning”, became habitual. Despite the silence he “collected” plenty of information during the course (w4t1). Indeed, being silent and not contributing was not necessarily equal to not learning. For one of the students the quiet, reflective type of learning was a part of the learning style. By the end of the course she admitted to lurking more simply because this type of behavior felt more natural yet did not prevent her from continuing to learn (w10notwithabang). During the fifth week another participant, who lurked more than contributed, mentioned that he definitely felt that he was learning and progressing towards his goal for taking the course, despite his silence (w5t3). At the end of the course lurkers were given an opportunity to talk about their experience of the MOOC. One of the posts summarized the experience (w10t1):

> My lurking provided me with a wealth of information and education into MOOC,PLE, PLN, PLC and how information and knowledge will be shared by all - teachers, students, kids, adults. These are abbreviations that were not familiar to me.

> […] PLENK has provided me an opportunity to listen to the experts. I am most interested in self-directed learners and motivation. […] I come in and read the posts that are of most interest to me. I wanted to know how it affects my teaching efforts, my learning, and how to share this with others. The discussions did give me a clear idea of how they are used by different people. I appreciate the opportunity to be a lurker, and have passed this group on to others. We are just beginning to understand what these new ways of learning/sharing can do for us, and how it will change the way we learn and use and pass on/teach our subjects.

While reasons for lurking were different for different people a lot of them agreed that simply "listening" to the conversations proved to be extremely beneficial. They were grateful for the opportunity and liked the fact of not having any pressure for participating in the course. It was mentioned that "most lurkers take the things they learn to the work place and put them into action" and, as mentioned by one of the course facilitators: "most lurkers were really learners who preferred self-directed learning, rather than social learning" (w10t1).

Overall forums showed to be a great place of learning: being accountable for written messages helped students to learn and research various topics discussed (w6t7). The social nature of this interaction allowed for the beneficial responses and for the useful feedback. From time to time participating in a discussion felt like a difficult task but the results of these challenged were always interesting:

> Expressing that response in a forum where others can disagree, helps, as you say, "*avoid the comfort of the weak assumptions and certainties.*" I struggle with wanting to sound as smooth as the academics, but I have not learned that. I've had to choose between remaining silent or taking the risk to engage at my own level. I've been pleasantly surprised at the results" (w6t7).

Students mentioned communication as an important part of the learning process. "I wish that more people were active on the forum!" wrote one of the participants (w9t2). Another MOOCer said that "The act of writing" helped her to bring "thinking into focus" (w2t5). The students were thrilled to be able to collaborate and to "hear" others: "The social dimension of the course (apart from the content and discussion) has been overwhelming. Lots of help, suggestion and niceness from everybody. Real collaboration" (w2t15).While the participants were unable to see each other, their written "voices" helped to "build networks", "sustain the flow" of the idea sharing, and establish trust within the learning environment (w8t2). "Some of the best info I get from this course is reading peoples comments about specific tools" wrote one student during the second week (w2t2). Others learned a lot by simply reading discussions: "Learned a lot from reading

your posts. They are among my 'Aha moments'" said one of the students during the eighth week (w8t2). During the sixth week one of the participants summarized the whole sharing experience of the MOOC: "I have learnt so much from my MOOC time, from my fellow nodes and the more experienced nodes like Stephen etc. However the sharing for me has been a vital component of this learning. A perfect node gives as well as takes. [...] there's an element of 'paying it forward' and I'm enjoying the humanity of the network in this respect" (w6t7).

MOOC experience at the end of the course. The topic of MOOC experience was mentioned again at the end of the course when one of the participants started a discussion saying "this course has gone through a development that seems like a frontier town in the American gold rush[…]. Intense excitement and rapid growth at the start. Ghost town and tumble weeds at the end" (w10t3). He was somewhat glad that the course was over and was not sure whether he felt that it was a successful learning experience. It would be wrong to assume that this person did not enjoy his MOOC experience. In fact, several posts later he mentioned developing a sort of MOOC addiction and jokingly said that the sadness was part of a "withdrawal" (w10t3). This initial post led to a discussion of the MOOC experience over 10 weeks. Students and facilitators noticed a big drop in the participation around the fourth week of the course. Several offered their suggestions on why that was happening and how it could have been avoided: "I wonder if there is a lesson to be learned from the data that suggests a drop off in participation at week 4/5. Maybe the courses should be shortened, keep the clients wanting more, rather than structuring the course around the desire of the instructors to keep it long and cover the material they want to cover" wrote one of them (w10t3). Another person asked whether there was a way to design a course that would keep "1000+ people engaged for longer than 4 weeks?" (w10t3). Some students voiced an idea that the drop-off should not be seen as a problem, but rather as a feature of the big scale open courses. Due to the open nature of the course people were encouraged to "attend for whatever reason they want, participate at whichever level and depth they like, and get from it whatever they want. Surely, then, leaving whenever they want is an essential part of the course" (w10t3). Another person compared the MOOC participation to Olympics, where the big opening ceremony is usually attended by almost every athlete however, as the competitions progress, some athletes leave after attaining their desired results (w10t3). She also mentioned that leaving early did not mean not having a successful learning experience. While her own participation dropped down over the last weeks of the course she adapted and passed on to her students much

of what she learned during the MOOC. She felt like she gained a lot and attained her personal goal (w10t3). One of the facilitators said that she felt lots of energy at the beginning of the MOOC and was "caught by the pulse of the event" (w10t3). By the fourth week she realized that there was no way for her to participate at the same level since she had other responsibilities, including her full time job. PLENK2010 consumed most of her evening and weekends and she felt that she had to slow down. While her participation and her engagement in the course have dropped she still learned a lot. One of the biggest discoveries for her was the use of Twitter. Before the course she felt that the character limit of the tool would not allow for any expressive posts but over time, she changed her mind and incorporated Twitter into her work and life (w10t3). She ended her post saying that the MOOC experience "has been great and has given [her] quite a bit to think about" (w10t3).

Happy with MOOC. Over time the initial shock changed to the appreciation and the mastering of various tools. As early as the first week students shared their happiness and their progress. "Regardless of what people think of PLEs as tools for learning, every day I move a bit forward in this MOOC. Feel more connected, freer to make my own choices, surrounded by bright interesting people" said one of the participants in his comment (w1t1). Over time students got comfortable with the format and figured out their own learning styles. Lots of those who felt dissatisfied and frustrated at the beginning of the MOOC voiced their happiness to be part of the learning experience later during the course. Students agreed that MOOC was somewhat challenging and overwhelming at the beginning but, as early as the first week, some of them were happy with the support provided by course organizers and "classmates": "I feel my learning had been scaffolded and am amazed by the power of my computer/Internet to support me as a learner that I do not yet know how to harness" – said one of the participants (w1t13). "It is overwhelmingly refreshing to be free of system restraints of outcomes for the learning" said another student coming several weeks later to the discussion of the second week (w2t15). Her thoughts were repeated by others: "Thank you to the many PLENKers who have taken the time to post helpful hints for survival in this unfamiliar environment and to the course facilitators who have taken on the challenge" said another student (w2t15).

Even though it was impossible to master all the tools and to read all the articles students agreed that they would continue using new tools and that their lives "would be enriched by resources and contacts generated by PLENK10" (w5t3). Being part of PLENK2010 was useful:

some students started blogging; others became familiar with Twitter and would continue using it as an educational tool (w6t7).

It is also important to mention that not everyone felt frustrated with the course. On more than one occasion students mentioned their satisfaction with the MOOC. As early as week 2 one of them wrote: "I am very happy of this course. I have not had much to take part in discussions but I have followed and learnt a lot of the course design and learning environment in general. Thanks for it to George and others responsible" (w2t2).Another person mentioned during the fifth week (w5t3) that she felt comfortable with the course and the newly acquired knowledge was helping her in her career and while she might have not shared as much as she wanted, overall the MOOC experience was extremely beneficial (w5t3).Participation in MOOC also brought some practical results. During the seventh week of the course one student reflected on his experience with new tools: "I've been amazed at how much I've learned in the last few weeks. ... [I] did my own tally of the tools I had used previously, the ones I've picked up recently and how many (old and new) are currently in use" (w7t8).The student was surprised at how many new tools were now firmly entrenched into his "toolbox". He commented that it was more than just a playful experience. He spent a lot time learning about new tools and was excited to participate in another round of MOOC (w7t8).

Posts from the last week of the course showed that active participants were very happy with their overall MOOC experience. Discussion threads of the tenth week were filled with thank you-s: “Thank you, it's been so much fun and we have learned a lot”, “I am thrilled to have stumbled upon PLENK2010 and grateful to have the readings and recordings to keep going back to. […]I plan to keep revisiting PLENK2010 for as long as it takes me to learn everything I can out of it” , “Thank you for all the references and papers I have enjoyed reading”, “I'm very sorry to see it [MOOC] ending. […] My let-down is tempered by the knowledge that I'll be able to pursue the topics in my own PLE, and by the valuable connections I've formed with several participants which promise to continue beyond the MOOC. Clustering happened”, “I do applaud and have been heartened by the generosity and transparency of many who have shared their thoughts, weaknesses, strengths, skills and strategies. My thanks to each of them, and to you and your fellow facilitators for providing the learning opportunity”(w10t3). Several participants proposed ways of keeping the community after the end of the course. Second Life was suggested as one of the places, since PLENK Second Life group was used throughout the course: “We are

planning to carry on meeting after this month. We would like to keep in touch with others in this PLENK. You are all so much fun to talk with. Although curiosity or need has brought this Mass together, a network can remain. People make that network" (w10t3).Another possible place was grou.pn group created by one of the students: "Many of us want to further build their PLE/N, learn on how to improve it, and like to exchange more practical or create groups to elaborate[...] beyond the course itself" (w7t7).

MOOC suggestions. While describing and discussing MOOC experience students were not only sharing their thoughts but often made suggestions to the facilitators. One student mentioned that facilitators could provide more guidance at the beginning of the course and show different opportunities of technology-use to students. She felt that without force people might not take the opportunities to try new tools and that the short time frame of the course was not enough to build the confidence of tool-using (w2t5).

Another student suggested that a more user-friendly interface for forums would make discussions easier to follow. As part of his learning process he would often review forum discussions and noticed that there was no easy way of marking posts that he liked and/or thought to be useful (w1t5). The overall course set up and Moodle were criticized by several people: "I found Moodle annoying to work with […] it seemed to me that the only way I could tell there was anything new in a discussion was either to enter it and see, or else memorize the date and time of the latest posting and compare that with my own last visit" posted one of the MOOCers (w10t3)."The navigation of this course has a lot of weaknesses in fact. I've found it's safest to always start from the HOME Page […]. Unfortunately, it's hard to get back there once you're inside Moodle" – posted another one (w2t2). Several MOOCers echoed his message: "I too have found it wisest to start from the home page ... but it's a bit frustrating that once you enter the Moodle, there seems no way back!" and "We keep getting moodle references but it is not intuitively clear when we are using moodle and when we are not. […] some more centralized tutorials/organization may help without destroying the decentralized/open concept" (w2t2). One of the facilitators answered that "most of the navigational weaknesses [of the course were] due to the use of Moodle, and it [was] not really possible to fix these problems without overhauling Moodle" (w2t2). He reminded everyone that outside Moodle the navigation was kept straightforward despite the fact that resources could be found all over the internet (w2t2).

Apart from the technology-based suggestions students talked about ways of improving the structure of the course. An idea of clustering students and providing a more detailed, "facebook-like profile" for everyone came up in one of the discussions during the fourth week of PLENK2010(w4t1). Another student proposed a similar tool a week later: "it might be helpful if people identified their interests/goals for the course and that data could be correlated so that it would be easier to find people with similar interests/goals" (w5t3). Several other ways of creating "clusters" were offered: grouping people by their course goals, "affinity groups" being created for individuals with different backgrounds, expertise levels, or interests (w5t3). Another possible grouping of students was suggested during the same discussion: "I would […] suggest that people are asked to assess themselves using terminology like lurker, gleaner, facilitator, etc. as well as assessing their use of PLE's in some way" (w5t3). He added that "a searchable roll of all participants […] cross-referenced to their level of expertise and, where possible, their particular interest within the MOOC" would have been helpful and would allow novice users find people who might provide help and support (w5t3). Several people mentioned the importance of helping new MOOCers. It was suggested to scaffold their learning at the beginning of the course, by proposing various tools and providing support for those tools (w5t3). Another suggestion was to "assigning" mentors for new students to help them build their confidence and knowledge (w5t3). Having an online place with hints for new users as well as "top tips for MOOCing/Moodling" was mentioned as ways of making the first weeks of the MOOC experience less overwhelming (w10t3).

The length of the course was mentioned a lot during one of the final discussions. While some students felt that the course was not long enough - "In some ways I'd wish for two weeks to explore each topic more thoroughly. It seemed to me that we were being rushed on to the next thing too quickly" (w10t3) - several mentioned the drop-off effect that happened during the fourth week and wondered whether a shorted MOOC would have been more successful. "[A]n open course should not be so long, and the summary should be daily only for the starting week, but then weekly. Furthermore, I would diversify the contents to not fall in too much repetition of modality" wrote one of the students (w10t3). There was no consensus on the length suggestion and one of the participants wrote the following: "the goal of these MOOC's seems to be to package distributed/networked learning into a 'course' paradigm, and maybe it just doesn't fit well. (w10t3)"

Poetic MOOC descriptions. MOOC experience led to several metaphorical descriptions. These descriptions provide an interesting and unusual view of the student's experiences. The first of them was posted during the first week of the course (w1t26):

> To me it's a bit like moving to a city in another country where they speak the same language you do (in theory).
>
> You've got some basic concepts: I need a place to live, I need to learn how to get around, I want to make friends, I want to try out new activities. But you don't necessarily know the cultural signals ("culture" meaning "the way people do things when they don't think too hard about what they usually do").
>
> Maybe Foreignville is the world capital of seafood, but that's not your interest, and so your Foreignville's going to be different from that of many other people.
>
> If you've never left Osage City, Kansas, then Foreignville's likely to seem really strange. You might gravitate to what seems familiar (what looks like home), and end up either in Kansas-like places, or else being mistaken (because it's a surface similarity).
>
> The advantage here is that (to continue overworking the analogy) there are lots of other people roaming around Foreignville. Some have tour buses you can hope onto. Some are expats who've lived here for ages. Some are friendly natives. (Some, probably, are unfriendly natives, or at least speak an incomprehensible patois.)
>
> And of course lots are other tourists. Some have immersed themselves in guidebooks; some have a meticulous roadmap they're following; some are enjoying what they find as they wander around.

During the same week another student compared her experience in MOOC with a trip to Disney World (w1t23)

> I think one may compare PLENK2010 open course to Disney World, where I went only once in my lifetime with my son 17 years ago.
> Expectations were high, entering into the park was exciting, amazing features [...]. But even in DWorld you have to read the map, you take the decisions, where, when and what to visit, where to participate and so on. You will collect the items, you decide upon. Your empty blog (empty suitcase) shortly will be filled with stuff. My advice, think of how to organize, while learning, you will reorganize anyhow - forgive me my motherly style, it comes with age.

Another poetic description was written during the fifth week of the course (w5t5):

> How do you reach the observation platform of PLENK MOOC? Hike the slopes to the top without feeling that you are climbing? Maybe, but that is not the question. I reached the observation platform already, and I'm sitting on the bench called "The end of 5th week of MOOC PLENK". I'm enjoying the breathtaking view. In front of me the

> mountain range of future "Rocky MOOCs" beautiful heights, with names, still to be invented, but I 'm entitled to take a deep breath now.

The description continues as the author compares MOOC discussion forums to inns and the Second Life to a spooky hotel that is known to be quite addictive.

Another poetic description came from a student during week four (w4t5). Coming to terms with the unusual format of the course, she wrote:

> Bewildered seems an appropriate state of mind for this course. […] The flow of knowledge seems muddled here. Sometimes, like Babylon in those first moments, we are struck strangers to each other only to puzzle alone until we can make the new familiar. […]
>
> Ithaca gave you the marvelous journey.
> Without her you would not have set out.
> She has nothing left to give you now.
>
> And if you find her poor, Ithaca won't have fooled you.
> Wise as you will have become, so full of experience,
> you'll have understood by then what these Ithacas mean.
>
> Bewildered is alright by me. That I can be bewildered by how I myself learn and simultaniously take comfort from theories on how others learn suggests some rethinking.

One of the students answered to the post: Frustrated, yes, but I wouldn't want to miss this PLENK adventure (w4t5). These poetic descriptions conveyed students' feelings and thoughts making conversations more intimate.

Use of technology

The use of technology and different technological tools was the second-most popular topic of discussion. Over 150 forum posts mentioned participants' experience with technology not just during the course but as a part of their learning and teaching outside the MOOC. One of the most interesting lines of discussion had to do with the use of technology in regular classrooms. The participants shared their experience and provided best practices of incorporating new tools in the learning process. Here is how one of the MOOCers used technology in the classroom (w9t2): "I have used blogs, with students commenting on each other's' writing. I find unless the comments are required, most students seem to lack the motivation to participate". The same person also provided a list of websites (blogs, articles, and even videos) dedicated to the "topic under investigation" to his students. As part of the activity, students were asked to select the most interesting and informative resource, share it on the blog, and make a 2-minute in-class

presentation of the resource. The activity was proven to be very engaging "all of them working on the same topic and sharing their findings proved to yield much better results than each of them working on their own and submitting results only to me" (w9t2). Furthermore, the list of chosen resources served as a reference tool for future activities. Another teacher used her class' site as a place for students to post articles and videos. She allocated some time during the class to discussion of these resources. She found that focusing her efforts on "using class time to maximize the benefits of the social interaction that occurs when the class is together and to minimize the amount of class time devoted to presentation of information" was extremely beneficial for her students (w9t2). She added the following later in the discussion:

> The efficacy of this approach was brought home when I used class time to show a copyrighted video that I could not post online. Several students remarked that this was not an efficient use of the class time. I was happy to receive this complaint, as it demonstrated that the approach described above was working. I then explained about why copyright caused me to have to do that and they understood. A useful teachable moment.

Other technological tools were mentioned during the same thread: wikis, forums, webquest activities, RSS feeds, and blogs. The social networking websites (like Facebook) were successfully used by several teachers since they were not only engaging to students but allowed students to share various type of information/files and even to create sub-networks (w9t2). During the same week in another discussion one of the MOOCers mentioned his reasons for using online tools and online learning in his teaching. He found that the online environment promoted learner independence, helped with the participation, allowed him to introduce students to online environment and teach them the basics of it, as well as to spice up the overall learning experience (w9t4). He also mentioned the results of an online survey he carried out in one of his classes. According to the results students preferred a combination of online and face-to-face learning, felt that small group face-to-face tutorials were most beneficial for understanding, and felt that the online mode of instruction helped them to be aware of the course developments and information (w9t4).One of the discussions in week nine (w9t2) was dedicated to tools already in use by students. Here is what one of the participants shared with her fellow classmates: “My dream scenario for this PLENK week would be, that all active teachers here ask their students to sum up all the tools they use for any kind of learning - including any projects or even games they participate in, which they feel to be part of learning for life, and to provide this resource to us here.” Her idea was to let students ‘think of their complete online life and to decide freely what

they experience as learning (for school/college/ university "and" life ;))" while giving MOOC participants a glance into "the untapped reality of PLE/Ns."

Technological tools. Technology played a big role in students' PLE and was used a lot during the MOOC. After the first week of the course a couple of students created and curated a separate discussion thread dedicated to the posts mentioning various technological tools and ways of using them (w2t1). The thread got over 100 comments with 75 of them describing new tools. Most of the comments were cut and pasted by the curators from other discussions but some comments were originals posted by other students. During week seven one of the curators re-posted the list of collected tools (w7t3). Participants found it extremely useful, specifically since by that time most of them felt more comfortable with the online environment and online tools as compared to the beginning of the MOOC."I remember looking at this list in Week2, but then I was still trying make sense of things. It reminds me of how lost I was in the first couple of weeks!" mentioned one of the students (w7t3)

There was also an abundance of useful technical information as well as personal experience and reviews of technological tools. It would be wrong to assume that all MOOC participants were highly familiar with technology. In fact several of them admitted that they were just beginning to explore tools outside of their emails and learning management systems; some of them were new to Facebook, others were writing their first blog posts or toying with an idea of using Twitter for educational purposes. Discussion forums allowed for the exchange of know-how between the experienced users and the novice e-learners. Some participants took up an initiative to have threads dedicated to tips and tricks on using certain software and answering any relevant technological question. During the sixth week of the course (w6t3) one of participants started a discussion thread by proposing 11 tips for using Elluminate. He had noticed that out of 1600 registered students only 40-90 have been attending Elluminate sessions. He received a lot of "thank you-s" and soon other participants were adding their suggestions and were sharing what they've learned about the software. The following week (W7T2) a collection of free online tools that do not require a log-in was created as an initiative of one of the participants, who was looking for various tools to help her students build their PLEs.

The participants not only talked about the tools they have used but also described various innovative ways of incorporating technology into learning and teaching. During the eighth week (w8t2) one of the participants mentioned a network created between her and another student

using Skype to “teach grammar and such to his ABE class. In turn, I hope to have lessons/booklets to sell on the web later on”. A week earlier another MOOCer set up a bingo-like game for other participants. The purpose of the game was to evaluate top 100 learning tools published by Centre for Performance and Learning Technologies (C4PLT) (w7t8). Students were excited to mark down tools they have been using and to learn about new tools proposed by C4PLT.

Finally, several students proposed different ways of optimizing already existing tools and technologies: during the third week (w3t8) student posted suggestions for ways of improving the tweet aggregating software and during the second week one of the participants proposed the following: “I do wish some cmap designer could have observed the PLENK participants - actually, it comes to my mind as another merit of MOOC: If you really want to get VERY critical feedback on the use and usability of your product, introduce it as a MOOC activity” (w2t2).

It is beyond the scope of this thesis to mention every tool or technical solution proposed by the students. The important point is that all students benefited from these discussions and various suggestions of technological tools. As one of the students said: “Some of the best info I get from this course is reading peoples comments about specific tools. It would be nice to see a forum that is simply a review of applications and educational tools with the one rule that people cannot use acronyms” (w2t2).

Concept maps

In tune with the ideas of connectivism discussion forums provided a place for the students to share information and to collaboratively build new knowledge. One of the best examples of such knowledge building happened during the second week of the course, when the term "concept maps" was introduced and the students were asked to download CMAP software to build a concept map and to answer several questions proposed by one of the facilitators (w2t2). This task provoked a reaction from one of the students (call him John for the purpose of this description) who was surprised to see such a "closed" task in an open course: "If this is a course about [personal learning] environments/networks, how come the facilitators are dictating an approach without any discussion or justification?” (w2t2). John was supported by several other students who were not sure about the usefulness of yet another technological tool. Several students found the software difficult to learn and/or use while others simply did not find any use of concept maps and though them to be annoying at best. One of the facilitators added to the

discussion by reminding that there was no precise structure in the open course, that the participants were free to do the proposed exercises or to skip them: "... these are options for those wanting peer review. If you don't want that structure, don't do the activities. If you don't like the activities I listed, please feel free to structure different approaches and activities" (w2t2).At the same time several participants were happy about the additional structure added to the course. "I, for one, am glad for the guidance and tool suggestions" - said one of the MOOCers (w2t2). Feeling unsure about the multitude of tools she preferred some guidance during this initial step in order to gain more confidence and to feel comfortable in the course. Another student suggested that using a common tool would let students compare their work as well as to work collaboratively on a task.

To help John understand the importance of the tool several MOOCers shared their experience with concept maps. As a response to his statement: "I'd like to have some guidance as to why it concept mapping a good thing, and why CMAP is the best tool to use for it" they posted links to articles and blogposts about concept maps (w2t2). One of the students directed John to the research article outlining the use of concept maps as a part of a successful educational process. Another MOOCer offered to work together on a concept map to "cut out some of the pain" (w2t2). Students who were more familiar with the concept suggested their favorite tools. By the end of the day the thread received over 30 responses and was one of the most popular discussions of the MOOC.

The reaction to the initial post and responses were very diverse. One of the participants summarized it in her post: "I love to see how people with fairly similar educational, cultural, and interest backgrounds (I am making a leap based on the fact that we are all here) can have such different responses to the same event. Such a good reminder to me as an educator that you cannot easily predict how the combination of words you use, strategies you employ might be experienced by different students" (w2t2). This discussion also showed what MOOC was all about. As one of the participants said: "the freedom to choose and to learn as you please" (w2t2)

After reading several articles John agreed that there was some use for the concept maps but he was still not sure about the difference between an older, more familiar to him mind maps and this new concept maps. He concluded his post by asking for more information about the value of concept maps. One of the facilitators explained the main difference between two tools: "Mindmaps are generally about brainstorming - i.e. detailing the elements and subjects.

[...]Mindmaps have a center. Concept maps do not [...]. A concept map tries to communicate more than a mindmap - it tries to communicate relatedness and reasons for relatedness" (w2t2). After reading through several research papers and watching a set of videos describing CMAP and its use for concept map building John was still unsure about the value this process would bring to his personal learning. Once again, he received a lot of responses in which other students shared their use of concept maps and benefits of this tool. Finally, at the end of the second day, John wrote the following: "I read the literature, watched the videos, followed the discussion and in the end decided that I'm here to learn so why not build a concept map to see what it feels like. And because I'm not the only one with issues, why not document my learning" (w2t2). He posted his initial concept map created with CMAP tool and received a lot of encouragements as well as recommendations from other students and facilitators. One student said that John's posts and support of others inspired him to create his first concept map. Several more people posted their creations, shared advice, feedback, and suggestions. There were lots of "thank you" posts directed to John and others.

The discussion continued, going on different tangents but coming eventually back to the topic of concept maps. "This is such a great thread - it shows in a nutshell so much of what this is all about. It was like reading a thrilling novel - is [John] going to come around or isn't he?" - posted one of the students (w2t2). She was grateful that John started the discussion and found his contribution extremely useful. She concluded by thanking him for an invitation to learning. Another participant echoed her thoughts: "I am glad, that [John] started the discussion. Moreover, that he expresses much better and precisely my concerns about Cmap and free choice in this MOOC, than I could myself" (w2t2). She thanked everyone for providing useful links, visual tools, and especially the research papers that she would not been able to find without the forum discussion. The experience made her feel more comfortable expressing her concerns and problems in a discussion forum. One more student thanked the participants for the discussion. He felt that due the collaborative and open nature of the forum him and others were able to "generate new knowledge, to tackle new routes" and to "seek solutions and new learning strategies for problem-solving".

Another useful project originated from this thread was an invitation extended to John by a student to participate in a course dedicated to concept maps. In this pilot, a group of educators would "discover together the pedagogical potential of such online visualization web 2.0 tools"

(w2t2). After seeing John's struggles with the tool and reading his posts she and her colleagues were extremely interested in John's opinion and his experience. The Concept map thread was later referenced in other discussions. Happening so early in the course it showed the true nature of MOOC and connectivism; openness and the importance of collaboration.

CHAPTER 5 - ANALYSIS

After reviewing the data from PLENK, some conclusions can be drawn about the cMOOC forum environment's capacity for fostering knowledge building in tune with connectivist theory, serving as a place for collaborative and co-operative learning, and providing a sense of social presence to all cMOOC participants.

Knowledge Building

Connectivism postulates that successful knowledge building happens in 4 stages: aggregation, relation, creation, and sharing (Siemens, 2004, 2005). During the first stage, the learner gathers and aggregates information on the topic of interest. After going through the collected information he/she switches to the relation stage during which new information is absorbed, processed, and added to the existing body of knowledge. In the third stage, creation, the learner integrates and manipulates acquired knowledge to create something new, and finally this new artifact needs to be shared with others in order to complete the cycle of successful knowledge building. The learning process, cyclical in nature, continues as the learner returns to the first stage of the process. As it is apparent from the description, connectivist knowledge-building can only happen in a networked environment where participants are communicating, building connections, creating, and sharing their knowledge. For connectivists, communication happens during all four stages of the learning process and a successful connectivist course needs to provide an opportunity for students to communicate with each other as well as with the experts every step of the way. Data obtained from PLENK shows that free and open discussion forums allowed for this opportunity. The fact that forums could be set up at any time and by anyone, allowed for interesting discussions on different topics and for various knowledge-building opportunities.

First and foremost, forums provide a platform for information aggregation. Students and teachers use the space to share links, articles, references, and other information relevant to the course. An exchange of ideas and discussion supports the process of knowledge building. One of the best examples of this is the discussion from the first week of the course, initiated by the author of one of the suggested readings. The participants were encouraged to ask questions in order to clarify the various statements made by the author. The open nature of these forums and the fact that they remained accessible throughout the course made them aggregation mechanisms, providing “storage” for various sources of information. Several other discussion threads served

as aggregators for topics as well - technological tools, ideas for incorporating blogs and social media in education, tools for concept maps building etc. Every participant was able to revisit these discussions, add missing information, and use these threads as a first step toward their own independent knowledge building.

Secondly, the innate nature of forums makes them a great place for relation, reflection, and thought-sharing. The MOOC participants posted questions, participated in discussions, and got a chance to clarify their understanding of certain concepts through the forum. While this step of a connectivist's knowledge-building does not necessarily involve "others", having input from peers and from experts brings another dimension to this stage of learning. Several times during the course, students used discussion forums to "think out loud", reflecting on the ideas and topics covered during the course. These posts always received attention from others and enriched the reflection phase of the knowledge-building process. The topics of these discussions varied from assessment and validation of knowledge and the use of technology in education to academic freedom versus student-center designs.

Thirdly, discussion forums also served as a place of creation and sharing of new artefacts. From the very beginning of the course, facilitators and more experienced cMOOC participants suggested that "missing" documents be created by students. During the first week of the course, amidst the initial confusion, one of the students said she would like to have a glossary of terms and tools used for personal learning environments. While no prepared material existed; others proposed that she works on a document and offered help in creating it. Several similar spontaneous projects were born as a result of discussions during PLENK. A total of 147 new artifacts were shared during the course, ranging from blogposts to large concept maps, documents, and videos. Sharing of new content was welcomed with great enthusiasm from the student's peers. During the second week, when one of the first big projects (video) was shared in a forum, the thread got over 30 posts in response. While most comments were simple acknowledgements, some of the students asked technical questions about different aspects of a movie-creation.

The most prominent example of connectivist knowledge building within the cMOOC is the discussion about Concept maps started by John and summarized in the previous chapter (w2t2). John, who initiated the conversation, had "never heard of concept mapping" and doubted both the proposed tool and the reason for using it. John openly reflected on the matter, provoking

an interesting debate between participants and turning the somewhat individualistic process of reflection into a collaborative activity. With students and teachers answering John's questions, the first part of the thread can be seen as an aggregation step of the connectivist learning process. Users shared new ideas, links to articles and websites, examples of concept maps, etc. John became "sufficiently intrigued" by concept maps and proceeded to use YouTube, his "favourite learning resource", to find videos about concept maps and CmapTools software. After relating existing and new information, John decided to give CmapTools a try by creating and sharing his initial concept map. He continued working on his concept map and posted a more detailed version later on, prompting more discussion and encouraging others to give CmapTools and/or concept mapping "a try". The whole thread gave rise to another collaborative project – a list of mind-mapping software available online. John summarized his learning experience by saying: "I read the literature, watched the videos, followed the discussion and in the end decided that I'm here to learn so why not build a concept map to see what it feels like. And because I'm not the only one with issues, why not document my learning" (w2t2). Without necessarily realizing it, John successfully completed all four stages of connectivist knowledge building: aggregation (reading the literature and watching the videos), relation (following and participating in the discussion and presumably thinking about concept maps), creation (building his concept map), and sharing (documenting his learning). The benefit of this discussion thread was noticed not only by John, but also by other MOOC participants as well. The Concept Map discussion thread was not the only example of connectivist knowledge building. Most of the discussions followed a somewhat similar pattern of questions, leading to idea generation, and then to the creation of artefacts. This particular thread, being the longest of its kind, demonstrated what connectivst learning within a cMOOC was all about.

While some ideas of connectivism might be debatable, one cannot argue with the fact that idea sharing is definitely a part of every knowledge building process. If learning is viewed as a linear activity, idea sharing can take place at the beginning (asking questions, getting opinions, collecting data), in the middle (brainstorming, presenting possible solutions, communicating with knowledgeable others), and at the end of the process (sharing results of the learning process, presenting project). It is virtually impossible to imagine a learning process that does not involve any communication. Discussion forums, like those in PLENK2010, greatly facilitate every step of the learning process.

Collaboration

In 1996 Friend and Cook outlined key attributes of collaboration; collaboration is voluntary, based on parity and shared resource, requires a shared goal, and includes shared responsibility for key decisions. Interaction and collaboration between students is an important research subject since it has been shown to increase student motivation and self-esteem, help develop cognitive and social skills, and encourage critical thinking. cMOOC forums serve as a platform for collaboration allowing students to talk and "team up" on certain projects despite the fact that there were no assignments or tests in the course. Several interesting collaborative projects happened as part of weekly discussions: a couple of students started and curated a "scaffolds and technical tools" thread to which they have added posts about new tools appearing during the course (w2t1). During the first week, three students started a thread dedicated to various resources used in creating a PLE (w1t14). A thread with tools useful for the concept map designing was created and supported by several students (w2t29) as well. During the third week, one of the students asked about Tweet aggregation and students collaboratively came up with eleven posts on the topic (w3t8). Another student asked for a list of simple online tools that would not require logging in. Twenty different suggestions were received as a part of the discussion (w7t4). Another fun and educational collaborative project happened during the third week of the course when one of the students adapted a Bingo game and asked the MOOC participants to mark various technological tools they have been using (w7t8). Data from the project gave rise to discussions about the use of technology. One of the MOOC participants said that he was impressed by the amount of new tools he adapted during the seven weeks of the course. During the sixth week, one of the students started a collaborative project listing and describing mindsets of successful PLE users (w6t1). The thread got very popular and collected over 25 posts. Towards the end of the course one student started a discussion with ideas for PLE outside of academic settings (w8t6). A collaborative project about PLE activities for the classroom was suggested by one of facilitators (w9t2). Another popular collaborative project was triggered by a request from one of the students to employ the Socratic method to some of the PLE-related subjects (w7t1). Students with a background in philosophy helped him understand the Socratic dialogue and the group had an interesting discussion about PLE, philosophy and Socrates.

Besides collaborative efforts within the forum, cMOOC discussions gave rise to several collaborative projects that continued outside of the MOOC. Two students connected via Skype to "exchange" their knowledge – teaching English grammar to the class and getting a set of lessons/booklets as a result of the project (w8t2). One student started a grou.pn space that would allow MOOC participants to collaborate and keep in touch after the end of the course (w7t7). Another student received an invitation to be interviewed for an article in a magazine (w3t5), while John, the main contributor to the Concept Maps thread, was invited to a research group interested in concept maps (w2t2).

Students greatly valued the input of others: "Thank you for sharing your insights with me" one of them wrote during the first week of the course (w1t24). Other students mentioned making useful connections not just with the content of the course but with peers as well. Students mentioned more than once that the forums served as one of the main sources of learning - in part because of the information shared by others.

Social Presence

PLENK forums contributed to the feeling of social presence throughout the course. Research showed that social presence plays an important role in learning, especially online learning, since students in these settings are not in close proximity to one another and generally do not meet in person. One of the main benefits of social presence is the sense of inclusion felt by students. Social presence is an extremely valuable part of online learning. It has been shown to increase participation, positively influence student motivation, and encourage learning. cMOOC forums provide students and teachers with an opportunity to "speak" in their "voice" and create their own social presence.

338 comments throughout the ten weeks of course time were labelled as "General comments". The "thank you" and "OK" posts may not have been the most content-rich posts but without them the conversations would have felt one-sided. Together with various acknowledgements, a total of 464 posts in the course ensured that students did not feel isolated and let conversations flow freely.

One of the biggest characteristics of social presence in PLENK2010 forums were the personal stories and anecdotes shared by students. Over 300 posts were categorized as personal experience. Students willingly shared their experience of using the various technological tools or told personal stories relevant to the discussion topics. Examples from their careers and personal

lives were brought up repeatedly, making the discussions feel more intimate and insightful. Besides sharing personal stories, students dedicated a lot of time to describing their experience with the MOOC itself. The sense of presence was established early in the course when students first used the forums to voice their frustrations and to share their original perceptions of PLENK2010. These writings were highly personal and driven by emotion. Many students admitted to feeling lost, overwhelmed, unheard, frustrated, and unhappy. Reading responses from others gave students a sense that they were not the only ones feeling this way, which strengthened the social presence of the course. There were plenty of people providing support and advice and sharing how they dealt with the initial shock of the course. This original bonding experience made the cMOOC forums a place of interesting and, at times, unusual discussion.

On more than one occasion, PLENK forums went outside of the original topic of discussion. These tangent conversations included personal experiences and discussions on various non-PLENK topics: what is learning and what is knowledge (w1t16), what education is for (w4t10), safety of personal data in an online word (w3t4), and many others. Students felt comfortable sharing their stories and eagerly participated in these tangent conversations. They shared their fears, failures, hopes, and happiness, which created a sense of intimacy within the course. A lot of personal details came up during discussions: fondness for Appalachian culture (w1t16), interest in French Canadian music, traditional Nova Scotia step-dancing and storytelling (w9t9), as well as a love for Goethe writings (w5t5).It is also important to mention that the average length of a discussion thread was 13.8 posts. The length of these threads shows that there was a lot of dialogue and back-and-forth communications that connected students and increased the feeling of presence.

Students and facilitators employed various non-verbal techniques associated with social presence: refereeing to each other by names, using emoticons and words like “hug”. Most users used their real pictures as avatars and shared links to their blogs, Facebook profiles, and personal pages. Some participants were even given nick-names by others: meerkat, jester. Humour, one of the indicators of social presence, was used a lot during the course as well. In fact, towards the end of the MOOC when discussion forums became quieter (Appendix B), one of participants wrote:

> I’ve been staring at this discussion forum all week, waiting for something to happen. Has some form of forum-fatigue set in? I can’t wait any longer, I must post something … even if it is just rambling … […] I respond with my system Complex Reiterative

> Analytical Placement [which is] simply put, could entail shutting off the machine in response to information overload. It also suggests a reiterative analytical element, in that unsolicited information can be dealt with by not subscribing to a plethora of information sources. (w8t5)

The semi-serious post received 10 responses with other participants further developing the idea of a CRAP system. Humorous comments began to appear in other forum threads as well. For example, during the seventh week of the course, several students had a non-serious back-and-forth about Monty Python, IKEA, and Second Life (w7t6).

Two other interesting discussions are worth mentioning here as they definitely helped in creating social presence. One of them happened during the "learning theories" week and was dedicated to flow and salutogenesis – concepts that are rarely covered in regular classrooms and do not always fit within traditional learning theories (w4t5). The thread was very popular, with a final count of over 30 posts. Most of the answers had personal details and were definitely contributing to the sense of closeness among students. The second interesting discussion happened during the last week of the course. The "PLENK before and after" thread was dedicated to final thoughts and a collection of images to illustrate student experiences within the MOOC. The thread was bittersweet as students were said their goodbyes and shared thoughts about the ten-week course.

The world of online learning can be chaotic and overwhelming for some. PLENK2010 showed this to be true for even seasoned online learners. That being said, online learning can also be quite a solitary endeavor. To help students feel included, it is important to build a sense of presence in any online course. Having an "introductory" class and a forum-like environment where students can introduce themselves and connect with each other could be one of the crucial social presence-building steps in a purely online course. PLENK2010 users suggested that it might be useful to provide students with a possibility of creating clusters or study groups based on their previous level of knowledge, learning goals, or interests. Having a space where more experienced learners can communicate, mentor, and guide novice MOOC participants would be very beneficial. These types of activities and resources would not only help students to overcome the initial shock of an online course, but would create a sense of online community that would last for the duration of the learning process.

Criticism of cMOOCs

The original cMOOC design had several drawbacks that became quite obvious while reading through the weekly forums. As mentioned earlier, lots of students voiced their disappointment and shock at the beginning of the course. The chaotic, unguided nature of connectivist learning coupled with a lot of new information proved very overwhelming for some users. First time MOOC participants were unsure where to focus their attention and were drowning in an ocean of new terms and a sea of proposed technological tools. Over time some of the students managed to overcome this shock and designed their own ways of dealing with the course by focusing on specific aspects of it, filtering information, and skipping material that was not of a particular interest to them. The confusion and the overwhelming feelings continued well into the course for some, as demonstrated by the thread during the fifth week (w5t3) and the comments from the seventh and the eighth weeks of PLENK2010. Providing more guidance to students at the beginning of the course would have been beneficial, especially for novice MOOC participants. While the main course page had a proposed way of dealing with the abundance of information, discussion forums showed that it was not enough for students. Perhaps a reminder of how to filter the content or maybe personal examples from facilitators with tips on how to navigate through a massive course would serve as scaffolds for MOOC users.

This type of guidance would have also been useful throughout the duration of the course. In fact, one of the participants mentioned that she would have liked to see more examples from course facilitators. cMOOC discussion forums showed that the involvement of facilitators in all aspects of a course is crucial to its success. The drop in forum activity about halfway through the course could be partially explained by the diminishing input from facilitators starting at the fifth week. One of the participants wrote about this in her post:

> I felt, that since 6th week the facilitateors could not handle the situation any more. For me, the enjoyment of participating stopped there. I still learned, since I want to know, what is going on in a MOOC from A till Z - critical participation. (w10t1)

Facilitators felt overwhelmed as much as students and were at times unable to keep up with all aspects of the course: During the ten weeks of the cMOOC,100 of over 2000 posts were written by facilitators. They answered student questions and started a couple of guided discussions, though more consistent input from facilitators paired with sharing of certain examples and techniques would have been beneficial

While the nature of connectivist learning presumes a rather chaotic and unstructured process, several students were confused by the lack of structure in the course. This can be explained in part by the lack of guidance mentioned above as well as the sometimes difficult interface of the course. The issue of the interface was mentioned by students and was also apparent during the data analysis. Moodle forums did not allow for marking specific posts. It was not always easy to find a post from one of the discussions. Furthermore, the overall setup of the course seemed confusing at times, which was mentioned by students during course discussions

To conclude, weekly discussion forums of PLENK2010 served as a place for collaborative knowledge building in tunes with ideas of connectivism. Students used the free structure of forums to "think out loud", connect ideas, share their projects, and ask for help. The underlying connectivist nature of the course made the exchange personal and collaborative thus increasing the sense of social presence. Despite the fragmented and distributed nature of the cMOOC students were successful in overcoming initial obstacles presented by the course nature and ended up learning about new tools, personal learning environments, and many other subjects outside of main topics of the course.

CHAPTER 6 - CONCLUSION

The MOOC phenomenon has been growing steadily over the course of the last several years. It began in 2008 with an experimental course by Stephen Downes and George Siemens at Athabasca University. Over the following five years, MOOC became a common term in the world of education. In fact, 2012 was called 'the year of the MOOC'. Hundreds of MOOCs are available today to students all around the world. However, there are a lot of differences between the first cMOOCs and today's xMOOCs offered by larger universities. The distinction between MOOCs implies that cMOOCs "emphasize creation, creativity, autonomy and social networking learning" and "focus on knowledge creation and generation" while xMOOCs employ "a more traditional learning approach through video presentations and short quizzes and testing and focus on knowledge duplication" (Siemens 2012). Most of the MOOCs offered today fall into the xMOOC category, but it would be wrong to disregard the ever-present cMOOCs. These connectivist courses can greatly help in gaining an understanding of ways to improve the newer xMOOCs. The best practices and successful tools of cMOOCs can be incorporated into other online courses as well. cMOOC patterns of participation, combined with the questions raised during cMOOC discussions are invaluable. The thoughts and ideas of participants can help to foster a better understanding of the struggles and successes of a typical MOOC participant.

The chaotic, non-linear structure of cMOOCs is based on the theory of connectivism – a computer mediated learning theory introduced by Siemens (2005). While the debate over connectivism's legitimacy as a full-fledged learning theory is ongoing, it cannot be disregarded in the discussion of mechanisms of contemporary learning (Moe, 2014). The first connectivist MOOC - CCK08: Connectivism and Connective Knowledge, held through the University of Manitoba began a series of courses focusing on knowledge building and meaning creation by using online tools and various networks allowing the use of ideas and information via unrestricted enrollment for students outside the university. CCK08 was not the first course with an open enrollment policy, but it was the first one with enrolment numbers reaching the thousands. The success of the first cMOOC led to other similar courses. Not all of them were unique to connectivism. Even though some were not even built upon the connectivist learning theory, they all shared similar pedagogy, structure, and assessment practices. With the main ideas being to foster collaboration and provide a first step for ongoing network building, cMOOC activities were focused around communication and teamwork. Students were actively involved in

the creation of the course through their work on the "missing" materials, by proposing ideas and topics for discussion, and by working on and sharing projects and artifacts relevant to the course. These courses resisted the notion of a student-teacher paradigm and employed various information management systems - often outside of the university's web presence (Couros, 2010).

A new type of MOOC was born in 2011 with Stanford University "opening" its Artificial Intelligence course. Access to the content and course activities was available to anyone in the world. The course attracted over 55 000 participants and became the first xMOOC. This course would later lead to the creation of tens, hundreds, and even thousands of similar courses offered by different Universities in many different countries. xMOOC pedagogy follows behaviourism, with a focus on the content delivery and the formality of assessment practices (Knox et al., 2012). Unlike the chaotic and distributed cMOOCs, xMOOCs run within a predefined online environment and provide direct instructions, usually via short videos, followed by immediate assessment (Parry, 2012). Due to the large number of students, most xMOOC assessment is automatic.

cMOOCs do not get as much attention today as xMOOCs, though these courses can be valuable not only for students but for researchers interested in connectivism and online learning as well. Reading through the content of weekly forums from PLENK2010 provided insight into the dynamic of a typical cMOOC, helped to understand the struggles of cMOOC participants, and showed the strengths and weaknesses of a connectivist course. PLENK2010 provided opportunities to investigate different learning environments and various subjects related to the concept. Participation in the course forced students to learn new technological tools, and hopefully become more digitally literate. That being said, cMOOC participation proved to be more than just about learning new concepts. It helped develop skills and attitudes compatible with connectivist learning. It gave students a chance to exercise learning autonomy, acquire new skills, and become part of a huge collaborative connectivist learning network. The connectivist concepts guiding cMOOCs can easily be transferred to a more traditional online learning environment and help create better courses. Furthermore, the setup of a typical cMOOC, while different from that of an xMOOC, can present different ways of incorporating collaboration into xMOOC environments. Finally, cMOOC discussion forums helped in building a sense of presence in the online setting. Regular online courses and xMOOCs can benefit from adapting

practices and tools used in the cMOOCs. By providing students with spaces for collaborative work and sharing teachers can encourage a level of social presence similar to cMOOCs. Instructors can help students by showing examples of non-verbal techniques for intimacy building. In a regular course environment, sharing personal stories and experiences can be incorporated into assignments and students can be encouraged to build intimacy by having a grade assigned to various activities involving the sharing of personal details.

While cMOOCs might not become mainstream in traditional educational settings, they are definitely a valuable medium for life-long learning. These courses provide opportunities for self-directed, student-oriented education. Further research of cMOOCs would help to adjust the structure of these courses and make them more enjoyable and useful for students. Other aspects of cMOOCs, like patterns of student engagement, reasons for lurking, as well as the use of tools could further help in improving current or developing new versions of MOOCs.

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APPENDIX A

PLENK2010 Posts per Categories Over Ten Weeks

	w1	w2	w3	w4	w5	w6	w7	w8	w9	w10
Discussion	187	156	85	120	64	46	118	53	36	63
General comment	95	90	14	31	10	16	48	3	5	26
New content	39	31	11	14	4	5	18	7	2	16
Technical questions	27	16	1	0	1	2	7	0	0	1
Know-how	11	21	3	0	6	4	8	0	0	3
Personal experience	48	81	10	29	24	30	21	19	16	52
Links	52	57	31	50	21	17	33	17	3	8
New technological tools	22	92	11	2	0	3	19	2	3	3
Info/remark	12	15	7	9	9	8	44	5	0	17
Total number of posts	493	559	173	255	139	131	316	106	65	189

APPENDIX B

PLENK2010 Number of Posts Over Ten Weeks