Virtual Teams and Communities of Practice: A Transformation Model for eLearning

Angela Martin

Christchurch Polytechnic Institute of Technology

martina@cpit.ac.nz

Trevor Nesbit

University of Canterbury

trevor.nesbit@canterbury.ac.nz

Abstract

The purpose of this paper is to present a model that eLearning practitioners can use to take advantage of research that has been conducted in the areas of virtual teams and communities of practice so as to promote an improved learning experience for eLearning students.

The literature on virtual teams is reviewed with the aim of identifying the key enablers of virtual teams and how they have applicability to an eLearning context.

A prior study conducted by one of the authors that explored how the concepts of communities of practice could be applied into an eLearning context is then reviewed.

Two building block models of how the literature relating to virtual teams can inform eLearning are constructed. These models are then integrated with the communities of practice study to develop a proposed model for eLearning based on virtual teams and communities of practice.

The proposed model can be used as a basis for further study into how eLearning practitioners perceive and apply the concepts of virtual teams and communities of practice in their own practice.

Keywords:

eLearning, virtual teams, communities of practice

1 Introduction and Research Question

For the purpose of this research an eLearning environment is defined as students partaking in learning via distance. The content for their course is housed within a Learning Management System (LMS). There may be the possibility of face to face encounters with either students or staff. A virtual team can be characterised as a group of people geographically dispersed who are collectively aiming towards a common purpose with the aid of communications technologies. Both eLearning and virtual teams will be examined. A community of practice for the purpose of this paper is described by Wenger (1998) as being a set of people who "share a concern, a set of problems, or a passion about a topic, who deepen their knowledge and expertise in this area by interacting on an ongoing basis".

It is hypothesised that at least some of the key enablers of virtual teams and some of the key aspects of communities of practice have relevance to eLearning. The application of virtual team key enablers to eLearning environments and the students learning within them will enhance the learning experience of eLearning students. More specifically the question is posed, "Which critical success factors of virtual teams and communities of practice, if any, when applied to the design, development, and deployment of eLearning material, enable the students who use the material to learn better?"

When it comes to the key aspects of communities of practice and whether they have relevance to students in an eLearning context, a study conducted by Nesbit (2008) is drawn upon.

This study will be of interest to eLearning practitioners and researchers in the domain of eLearning, virtual teams and communities of practice as it provides a different perspective from which all three can be viewed. It should be noted that there are possibly other bodies of knowledge in addition to virtual teams and communities of practice that could be used to further inform eLearning.

2 Research Methodology

Literature is examined from the virtual team domain, and the eLearning domain to determine whether concepts from the virtual team domain can be used in the eLearning domain. Some of these aspects were found to be applicable enough to be transferred and potentially create a new body of knowledge.

This examination of the eLearning and virtual team literature review shows which critical success factors of virtual teams can be validly applied to an eLearning context. The literature review findings are significant as they show existing views from both sides of the eLearning /virtual team spectrum. Two building block models are developed to show the relationship between virtual teams and eLearning.

A previous study by one of the authors of this paper explored the concepts of communities of practice and how they can be applied to an eLearning context. The purpose, methodology and conclusions of this paper are reviewed. The conclusions are then integrated with the findings from the literature review of virtual teams and eLearning.

A proposed model for eLearning based on key concepts from the virtual teams and communities of practice domain is presented, along with the challenges that exist for eLearning that can be the focus for further research.

An ethnographic approach is taken in this paper as the aim of the paper is to make more sense of eLearning by viewing aspects of eLearning through the virtual teams lens and the communities of practice lens.

The limitations of the research include that there may be other bodies of knowledge that could help to inform eLearning and that this model has yet to be tested through interviewing and/or surveying eLearning practitioners and students as indicated at the end of the paper

3   Literature Review

3.1   Introduction

In the current technological age, the networked society (based around technology) is producing communication that is less personal. If people are to participate with each other, rather than simply interact they need to know each other as subjects rather than objects (Matheson, 2008). Virtual teams are viewed by Maruping and Agarwal (2004) to determine whether the team's interaction through information and communication technologies (ICTs) can be made more effective.

When Marc Prensky (2001) coined the term "Digital Natives" in referring to the generation that has grown up with technology such as computers, game consoles, MP3, and cell phones, he stated that educators should adapt to the digital natives. The 'tried and true methodology of teaching', that is, step-by-step instruction should be replaced with more random access and teaching at a faster speed. Digital natives are now common place, and recent research shows that there is a social divide happening. Some examples include "Have core discussion networks changed?", "Is the networked society producing communication that is less than personal". (Matheson, 2008; McPherson, Brashears and Smith-Lovin, 2006).

A number of key enablers of virtual teams have been identified including culture, communication, and trust (Maruping & Agarwal, 2004; Sarker, Nicholson, and Joshi, 2005; Bergiel, Bergiel, and Balsmeir, 2008). While considering how technology can impact social behaviour, perhaps in a learning environment a matter for investigation could be whether these key enablers of virtual teams can be applied in eLearning environments where there is no pedagogy for internet use (Aderinto, Aderinto, and Akande, 2008). Another factor to consider is the differences between teaching in a face-2-face setting and an eLearning environment (Ryan and Hall, 2001).

The following pieces of literature attempt to explore whether the above mentioned virtual team key enablers can enhance the eLearning experience of students by producing a sense of belonging within the learners' community.

3.2   Virtual Teams

The term "Virtual Team" is defined as a group of people geographically dispersed; they are committed to a common purpose, have skills that complement each other and their communication is enhanced by technology. Virtual teams have a high potential for misunderstanding each other and the tasks required of each other due to their inability to communicate in a face-2-face context.

While researching the importance of virtual team key elements Sarker et al. (2005), sampled graduate students from both Norway and the United States. The sample group was set a project and between the two countries they had to be part of a virtual team to complete the project. Sarker et al. (2005) employed the use of the WebCT Learning Management System (LMS) as the technological tool to aid collaboration.

3.3   Four Cs

Sarker et al. (2005) refers to the "Four Cs" as key enablers that can influence the knowledge transfer within virtual teams. It is also suggested that key enablers are used by individuals within a group who transfer large amounts of knowledge to other members of the team. These key enablers are communication, capability, credibility, and culture.

Communication or more specifically the volume of communication is listed as one of the key enablers. As the more often communication is used the less chance there is of misinformation and the anxiety caused by being misinformed.

Capability is defined as domain expertise, people in the team who "know their stuff". As the team member(s) who is 'capable' has a greater source of knowledge that can be transferred.

Culture can potentially impede a virtual team as team members are likely to have experienced different cultures. This key element is important in teams that span a nation as well as the globe as global cultural differences are more recognized. However, national cultural differences are not so noticeable but yet exist.

The term credibility revolves around trust and reputation, and how much a team member can be trusted. Sarker et al. (2005) argue that "when a source of knowledge is not perceived as credible ….. the advice and exemplars offered by the source are likely to be challenged." They also mention that trust is a key variable that is at the core of virtual teamwork that can be defined as successful.

Sarker et al. (2005) found that for team members to be seen as effective knowledge transfer agents the following key elements were desirable; communication, collectivist values (referring to culture), and credibility due to trustworthy behaviors and high performance. It should be noted that they found that capability did not enhance the extent of knowledge transfer. However, credibility (trust) was the critical determinant that not only increased knowledge transfer but when credibility was combined

with a highly communicative team member there was a marked increase in the transfer of knowledge.

Other literature pertaining to virtual teams makes note of the importance of trust as one of the factors that promote enhanced team relationships. Bergiel *et al.* (2008) suggest that trust is "especially vital for virtual teams because of the lack of personal face-to-face interaction". Knowing that other members of the team can be counted on to finish tasks is part of the trust factor but also fall into the area of communication. Notably Bergiel *et al.* (2008) states that although teams both virtual and traditional communicate, virtual teams have a tendency to communicate asynchronously. Due to this type of communication regular daily meetings can be the key to building relationships built on trust.

As can be seen from the above literature, trust is possibly the single most important factor (key enabler) for virtual teams. With technology proving a hindrance to communication (asynchronous communication, and lack of face-to-face contact) as much as a help (faster communication, and the ability to reach more distant locations) adapting factors from face-to-face communications such as trust can only be beneficial and enhance virtual interpersonal relationships.

3.4 Elearning

Online learning / eLearning / distance learning are all terms that suggest student learning takes place with the student located in one place, and the instructor located in another. One of the differences between eLearning and face-to-face learning is the lack of interpersonal communication that exists between instructor and student as well as student to student. According to Lewis, MacEntee, DeLaCruz, Englander, Jeffrey, Takach, Wilson, and Woodall (2005) "Online course[s] with just lecture notes or slide presentations do not allow users to be active participates in the course. Discussion brings a dynamic element to the online class. It is the key to making the course an interactive experience." It would appear that even in a setting such as an online class, communication enhances the overall experience.

Richardson and Swan (2003) state that "Social presence theory, a sub-area of communication theory, postulates that a critical factor of a communication medium is its "social presence,"". Elearning has the ability to help transfer knowledge to a far wider group of students, who could be located on-site or in another country. This gives the students far greater choice of when they can study as they do not have to adhere to a structured timetable, but the students also are able to choose where they would like to study. This is primarily because distance and schedules become irrelevant within an eLearning context unless the students interact, as by interacting the students are required to take into account each other's time restraints. However, as much of what is learnt in a face-to-face classroom is via general discussions, interaction and the like, can eLearning environments provide the same level of classroom culture and quality communications? Aderinto *et al.* (2008) argued that "distance education has

a great potential for the expansion of educational opportunities. This underscores the importance of collaborations in distance education as a way of enhancing its efficiency and productivity in transmitting knowledge to a wider populace." As found by Gunawardena and Zittle (1997) "social presence is a strong predictor of satisfaction in a computer conference.". However, according to Aderinto *et al.* (2008) academic barriers that impedes the effectiveness of collaboration in eLearning. Some of these barriers include cost, academic quality and a lack of technological knowledge.

Each eLearning student takes steps into what could be perceived as oncoming traffic each time they are asked to discuss their opinions, or show their work to people they barely know or have never met except in their virtual classroom.

The above literature is specific to learning with technology, it supports the need for social practices to engage students and enhance their learning experience.

3.5 Social Behavior and Technology

According to Prensky (2001) "Today['s older folk were "socialized" differently from their kids, and are now in the process of learning a new language". With the high use of technology in modern society, especially mobile phones, internet usage and game consoles, it has been noted that social behaviour and communication with close friends has diminished (Matheson, 2008; McPherson *et al,* 2006). In return the abundance of online 'friends' fall into the category of 'weak ties', whereby members of society are now spending more time interacting with their online friends than the close friends that were evident twenty odd years ago. According to Matheson (2008), the networked society (based around technology) that our society now resides in is producing communication that is less personal. If people are to participate with each other, rather than simply interact they need to know each other as subjects rather than objects. Where subjects' lives are known about at a personal level and objects are known of without sharing personal information about themselves.

The use of technology has rapidly changed lives. When reflecting on the invention of the telephone to aid communication via distance, it is obvious that communication occurred at a faster pace than previously. People were able to be contacted across long distances, contact with more people than neighbours and close relatives occurred. However, since the now common place mobile phones and internet capabilities the opportunities for interpersonal communications has increased exponentially. There is a line between quality and quantity of communication that seems to have been crossed in recent years. This means that the quality of communication has decreased such as family gatherings and having coffee with friends while the quantity has increased via text messages, social networking and the like. As verified by Matheson (2008) when referencing Stivers (2004), the "technological personality" of the

networked society seems to "militate against establishing sincere relationships".

3.6 Knowledge

Knowledge types as defined by Roy and Roy (2002), "Explicit knowledge is relatively easy to code and very external in nature….Tacit knowledge, on the other hand, is relatively harder to code and extract, and is very internal in nature". Also suggested by Roy and Roy (2002), is that tacit knowledge is possibly more important than explicit knowledge as it "encourages quantum shifts in knowledge".

As Sarker *et al.*(2005) have defined capability as domain expertise, and that virtual team members who exhibit capability are known as a greater source of knowledge. These team members have the ability to transfer their knowledge as they are so conversant with their subject that they can share their expertise via a multitude of contexts. This also helps

4 Review of Communities of Practice and eLearning Study

4.1 Purpose of the Study

This prior study by Nesbit (2008) aimed to identify how concepts from the communities of practice literature could be applied successfully to an eLearning context.

The definition of a community of practice from the work of Wenger (1998) was used as the basis for much of this particular study, with this definition being that a community of practice is a set of people who "share a concern, a set of problems, or a passion about a topic, who deepen their knowledge and expertise in this area by interacting on an ongoing basis".

4.2 Methodology of the Study

The methodology followed in this prior study involved a literature review of communities of practice and how key aspects of communities of practice could be applied in eLearning.

This literature review was followed by interviewing a number of eLearning practitioners who were all involved in the delivery of courses to students who were studying information technology related courses in tertiary education institutions in New Zealand.

4.3 Conclusions of the Study

The conclusions of this prior study included that students are more likely to form a community of practice, and therefore benefit more from the learning experience if:

- They have a passion to deepen their knowledge and interact with others about their topic.

- They already know each other, or who are given a chance to get to know each other in person.

- They have familiarity with the technology, and more importantly, familiarity with using the technology to socially interact.

- They are from similar contexts and with similar or shared experiences.

5 Analysis and Discussion

5.1 Virtual Teams Building Blocks

As can be seen in the literature review of virtual teams and eLearning, it has been argued by many authors that trust is potentially the most important aspect of a well functioning virtual team. It is hypothesized that communication and trust in an eLearning environment will facilitate greater student interaction and learning.

As stated by Connaughton & Shuffler (2007), teams that have high trust or regular communication may not experience cultural differences. Although they state that this point requires further investigation, it is viewed that trust without communication would deteriorate. It has also been found that fostering trust is valuable when reducing conflicts or enhancing team dynamics. Elearning students should be provided with the tools that enable interaction that would incorporate trust and communication building. Two of the points made by Gibson and Nesbit (2006) regarding eLearning environments is that the environment should include a constructivist approach where students learn best when their learning environment allows them to participate in authentic activities with real-world connections. Gibson and Nesbit (2006) also state that the students should "collaborate with peers in solving real world problems".

As stated by Araujo and Chidambaram (2008), there have been few endeavours into how context impacts trust in virtual teams. Martin and Nesbit (2007) have also stated that the significant notion of context can be taken from the world of Knowledge Management and successfully applied to an eLearning context. Although there are many contexts that students can originate from such as cognitive ability or preferred learning style, Araujo and Chidambaram (2008) suggest "group outcomes will vary based on the combination of technologies and task types". To give the students an enhanced eLearning experience by producing a sense of belonging within the learners' community it would seem that context should be taken into account when creating eLearning environments. It is necessary for the person(s) developing the course to identify how the students will achieve when performing set tasks.

From the perspective of the learner the fulfillment that could be gained from partaking in a course that supports learning via teamwork and communication should in turn increase the learners' productivity. As noted by Richardson and Swan (2003), "communication tool supports and facilitates active learning and collaboration, which, in turn, can increase motivation and satisfaction in online courses". As discussed by Fleming, N. (2001) with reference to online learning, reflection is the most

important key. A communication tool allows the learner to reflect. By introducing collaboration for the student active learning takes place. There are other pressures on the student that may not allow them to consistently partake in group work, such as group online meetings being held at times when not all team members can attend. This would have to be addressed by the group or the instructor.

The culmination of the research should determine whether virtual team key enablers can be used in eLearning. The result is a model that depicts which key enablers of virtual teams can be applied successfully in an eLearning context so as to foster students' engagement in knowledge sharing.

As can be seen in Figure 1, communication already exists to some extent in eLearning under the headings of Social Presence and Interaction. The communication that the student can partake in should at the very least enhance the reflective nature of what has been learnt.

Figure 2, shows credibility as one of the factors that should be included in eLearning. As the social connector that trust evokes enabling quality communication, participation, and learning.

5.2 Integrating Communities of Practice with Virtual Teams Building Blocks

The conclusions of Nesbit (2008) connect with different aspects of Figure 2. Firstly, the importance of students already knowing each other is related to a large extent to the concepts of credibility and trust. Secondly, the familiarity with using the technology for social interaction is closely related to the social communication part of the model. Thirdly, the benefit of the students being from similar contexts and having similar and shared experiences is closely connected to the concept of culture in the model. Finally, the passion to deepen knowledge and interact with others about the topic may appear to be connected to the concept of capability which was related to people in the team who "know their stuff", the passion aspect of communities of practice is more about members who desire to learn more, as opposed to the capability aspect of teams which is more about people being experts in their area.

By integrating the conclusions of Nesbit (2008) with the analysis of virtual teams and how they relate to eLearning a number of important aspects arise, that if all present in an eLearning context, should promote better learning for the students involved:

- The ability to be able to socially interact with the technology being used – social communication with technology. This is an overarching concept that emerges in this paper.

- Passion for the topic and the desire to learn more about it.

- Appreciation of the culture, experiences and context of the students – culture and context

- Students having the chance to get to know each other so as to build credibility and trust with each other – credibility and trust

This is reproduced in Figure 3, showing social communication with technology as being an overarching requirement, with the remaining three aspects being shown in intersecting circles. The contention of this paper is that where all four of these aspects are present (the section of the model labelled "EL"), better learning for the students is promoted. The challenge that remains is how to bring about any of the aspects it is missing either partly or in whole. In the section of the model labelled "A", the aspect that is missing is credibility and trust. This scenario could exist in an eLearning context when the students all have a passion to deepen their knowledge, and have aspects of culture and context in common (perhaps from working in the same organisation or being of the same ethnicity), but who for whatever reason do not trust each other.

The section of the model labelled "B" is where the missing aspect is passion. In an eLearning scenario this could exist where the students have a good degree of trust between each other and where they have culture and/or context in common, but do not have a passion or desire for learning more about their topic.

In the section of the model labelled "C", the missing aspect is culture and context, and as such this could take place in an eLearning scenario where the students have passion to learn more, and they have a degree of trust, but do not have similar enough backgrounds to each other for shared analogies and metaphors to make sense.

The challenge for eLearning practitioners is to find appropriate methods to move from sections A, B or C in this model into section EL.

The concepts and models presented in this paper would all need to be tested by interviewing and/or surveying both eLearning practitioners and students about their experiences in, and their perceptions of eLearning.

6 Conclusion

There are many aspects of both virtual teams and communities of practice that provide a window through which a better understanding of eLearning can be gained.

As highlighted in the model in Figure 3, there is an overarching need for the participants in an eLearning setting to have the means for social communication with technology.

Three other aspects that emerge for successful eLearning in this paper are shown in the three intersecting circles in Figure 3 with these being:

- Culture and context

- Passion

- Trust and credibility

67

The challenge for eLearning practitioners is to find appropriate ways for improving social communication with technology in a manner that is appropriate for eLearning and to find ways of addressing aspects of (a) culture and context, (b) passion and (c) trust and credibility when they are not present to a sufficient level, with these all being issues on which further research could be based.

References

Aderinto, J., Aderinto, C., and Akande, J. (2008) Collaboration in Distance Education: Problems,Benefits, and Prospects. *The International Journal of Technology, Knowledge and Society,* 4 (2): 87 – 92

Araujo, A.L. and Chidambaram, L. (2008) 'A dynamic perspective of trust in virtual teams: the role of task, technology and time*', Int. J. Networking and Virtual Organisations,* 5 (1), pp.4–16.

Bergiel, B., Bergiel, E., and Balsmeier, P. (2008). Nature of virtual teams:a summary of their advantagesand disadvantages. *Management Research News,* 31 (2): 99 – 110

Connaghton, S. and Shuffler, M. (2007) Multinational and Multicultural Distributed Teams: A Review and Future Agenda. *Small Group Research*, 38 (3): 387 – 412

Fleming, N. (2002). *55 Strategies for Teaching.* Christchurch, New Zealand: Fleming.

Gibson, A. and Nesbit, T. (2006). Belbin Team Roles, Organisational Patterns and eLearning: A Case Study. *Proceedings of the 19th Annual Conference of the National Advisory Committee on Computing Qualifications (NACCQ 2006), Wellington, New Zealand.*103- 108

Gunawardena, C. and Zittle, F. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *The American Journal of Distance Education,* 11(3), 8-26.

Lewis, B., MacEntee, V., DeLaCruz, S., Englander, C., Jeffrey, T., Takach, E., Wilson, S., and Woodall, J. (2005). Learning Management Systems Comparison. Proceedings of the 2005 Informing Science and IT Education Joint Conference (pp17 – 29). Flagstaff, AZ

Martin, A. and Nesbit, T. (2007). eLearning Deployment: Knowing your Context. *Proceedings of the 2007 New Zealand Applied Business Education Conference, Dunedin, New Zealand.*

Maruping, L. M., & Agarwal, R. (2004). Managing Team Interpersonal Processes Through Technology: A Task–Technology Fit Perspective. *Journal of Applied Psychology* , 975-990.

Matheson, D. (2008). Alienation and the knowledge of Persons in the Networked Society. *The Fourth International Conference on Technology, Knowedge & Society* .

McPherson, M., Smith-Lovin, L., and Brashears, M. (2006). Social Isolation in America: Changes in Core Discussion Networks over Two Decades. American Sociological Review, 71 (3): 353 – 375

Nesbit, T. (2008). Developing Communities of Practice for ICT Students in an eLearning Context. A New Zealand Story. The International Journal on Technology, Knowledge and Society. Vol 4, 2008.

Prensky, M. (2001). Digital natives, digital immigrants. On the Horizon. NCB University Press, 9 (5).

Richardson, J. and Swan, K. (2003). Examining Social Presence in Online Courses in Relation to Students' Perceived Learning and Satisfaction. *Journal of Asychronous Learning Networks.* 7 (1): 68 - 88

Roy, P. and Roy, P.M. (2002) Tacit Knowledge in Organizations: A Move Towards Strategic Internal Communications Systems. *Journal of American Academy of Business.* 2 (1): 28 - 32

Ryan, M. & Hall, L. (2001). eLearning, Teaching and Training: a First Look at Principles, Issues and Implications. In C. Montgomerie & J. Viteli (Eds.), Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2001 (pp. 1603-1609). Chesapeake, VA: AACE.

Sarker, S., Sarker, S., Nicholson, D., & Joshi, K. (2005a). Knowledge transfer in virtual systems development teams: an exploratory study of four key enablers. *IEEE Transactions on Professional Communication* .

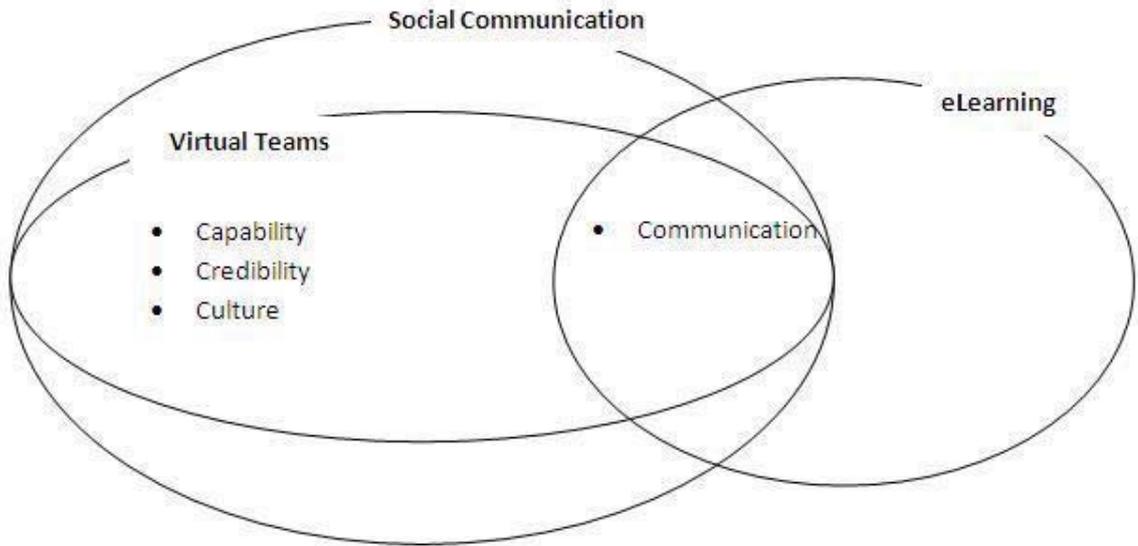Wenger, E. (1998). Communities of Practice. Learning, Meaning and Identity. Cambridge: Cambridge University Press.

Figure 1. Key Enablers of Virtual Teams related to eLearning and Social Communication Ver 1.
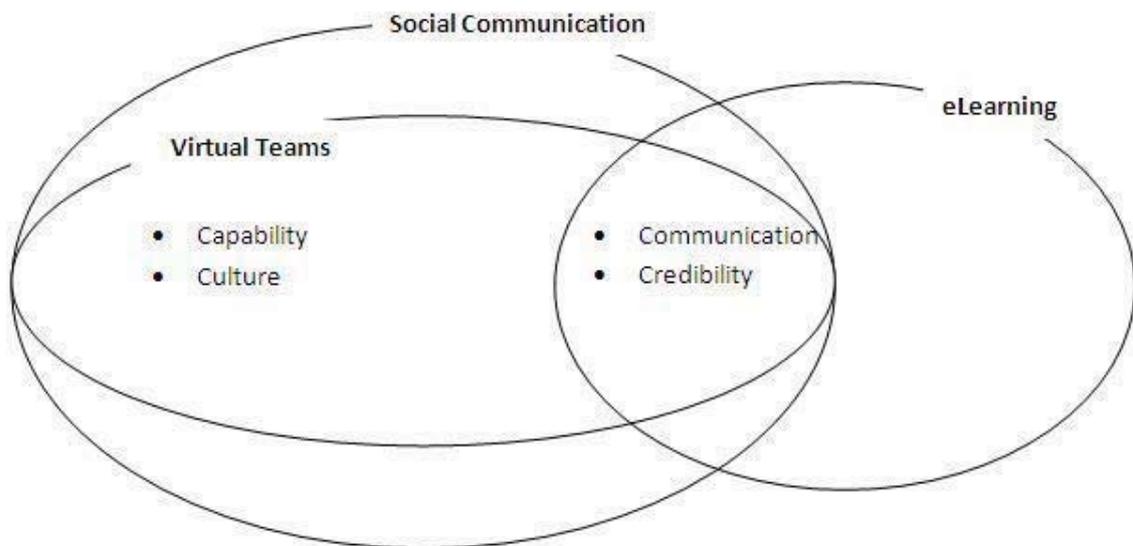

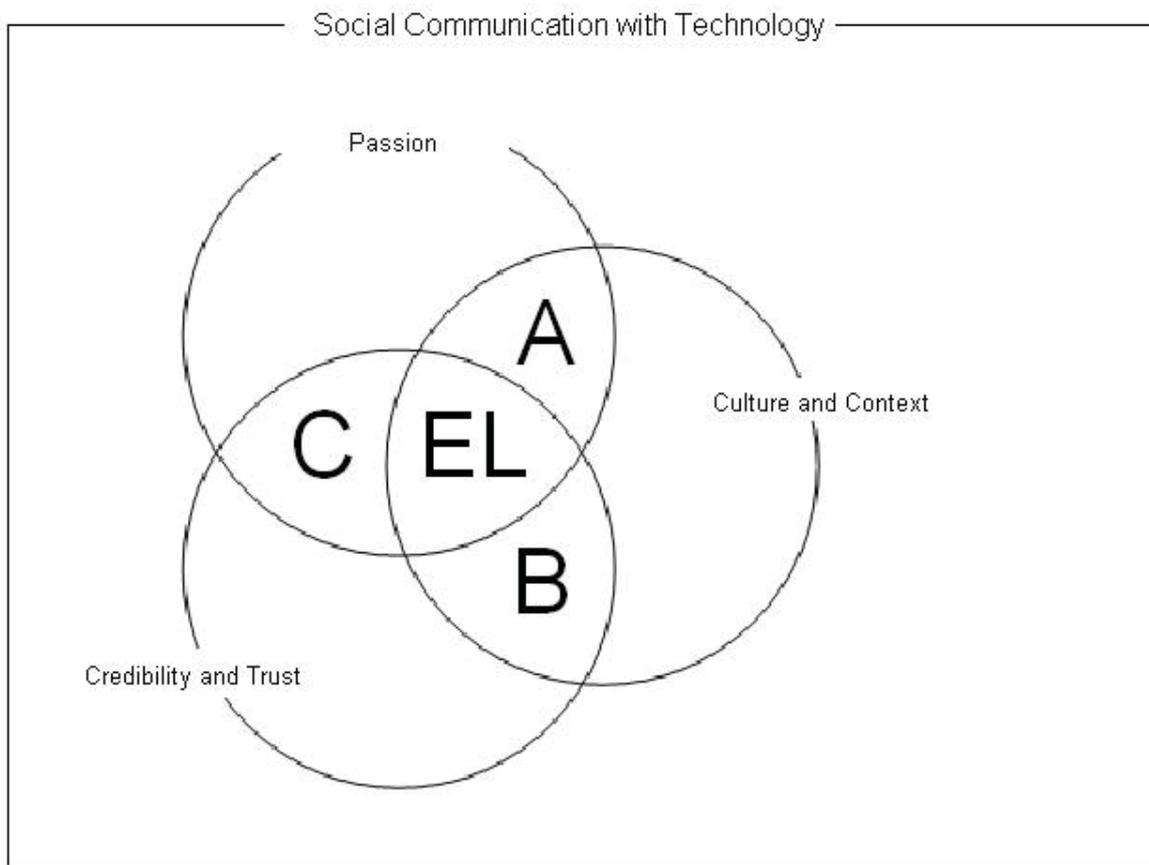**Figure 2. Key Enablers of Virtual Teams related to eLearning and Social Communication Ver 2.**

Figure 3. Model for eLearning Based on Virtual Teams and Communities of Practice