

The Possibility of Using Social Software to Support Collaborative Learning

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Abstract

The first part of this article examines how different schools of learning theories reveal the essence of learning and how learning theories evolve to meet the needs of the society at the time. In its second part, this article explains the reasons why in digital age there is a need and trend to develop online collaborative learning mainly based on socio-constructivist and socio-cultural approaches. The third part of this article clarifies that characteristics of social software go very well with collaborative learning, thus tools of social software has great potential to be used to design online collaborative learning environments.

Keywords: social software, collaborative learning, learning theories

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Introduction

With the advent of Web2.0 technologies, online collaborative learning has developed exponentially. Many ICT-supported online platforms for collaborative learning have come into people's eyes, such as Livemocha and Verbling. Although technologies seem to have increasingly influence on learning, there is ongoing debate about whether using a particular delivery technology improves the learning (Beynon, 2007; Clark, 2001; Kozma, 2001). Clark (1983) claims that technologies are merely vehicles that deliver instruction, and the reason for students' benefit is not the learning technology itself, but the instructions built into the learning process. Schramm (1977) also suggests that learning is influenced more by the content and instructional strategy in the learning materials than by the type of technology used to deliver instruction.

On the other hand, some scholars, such as Kozma (2001) argue that media does influence learning. Students could benefit from those real-life models and simulations designed by technology. There seems not to be one definite conclusion for this debate. However, what could not be neglected is that compared to over the past decades, today's students grow up in the environment of ICT and have been influence by different technologies, thus they have been described as net generation (Tapscott, 2008) and digital natives (Prensky, 2001).

Net generation students' ways of learning are characterized as:

- Learning in groups with their peers

- Learning by doing rather than passively listening, learning through discovery
- Hypermedia learning
- Seeking to interact with others – online or face-to-face
- Not just consuming information but creating and re-creating it
- Goal and education oriented

(Frand, 2000; Prensky, 2001; Oblinger, 2003; Oblinger & Oblinger, 2005; Hartman et al., 2007; Philip, 2007; Barnes et al., 2007)

Some scholars assumed that students labeled as “the net generation” tend to interact with each other, either online interaction or real life interaction. And they prefer learning in groups than individual learning. Interestingly, the features of the learning preference of the net generation students align with the pedagogical approaches of collaborative learning, featured by students interact with each other actively to participate in collaborative work or activities. (Dillenbourg, 1999; Weinberger, 2003). Students of the net generation are regarded as users of technologies, the relevant assumptions are that they:

- Are fascinated by new technologies
- Prefer social networking and resource-sharing sites
- Prefer using the Internet as social technology
- Prefer ubiquitous connection
- Use technology as tools for exploring, communicating, and socializing
- Use technology as part of their learning - as “thinking prosthetics”
- Are able to intuitively use a variety of IT devices and navigate the Internet

- Move seamlessly between physical and virtual interactions

(Frاند, 2000; Oblinger, 2003; Oblinger & Oblinger, 2005; Lorenzo et al., 2007; Hartman et al., 2007)

The above assumptions indicate that computers and different technologies have become an integral part of the net generation's life. They use technology as a tool for exploring, communicating, and socializing. Tolmie and Boyle (2000) indicate the importance of prior experience of using different online environments as a factor affecting the success of collaborative learning, especially online. The characteristics about the net generation testify that there is a great potential for using social software to facilitate online collaborative learning.

This paper would first review the development of major learning theories from a historical perspective, then examine how learning theories could support online collaborative learning, and finally discuss the potential of using social software to facilitate online collaborative learning.

The Development of Learning Theories

There are three major schools of learning theories: Behaviorism, Cognitivist and Constructivist.

Behaviorism argues that learning is a change in observable behaviors caused by external stimuli in the environment (Skinner, 1974). The rationale behind behaviorism is that observable behavior is an indication of learners' learning levels, which is measurable while what is going on in learner's head is unobservable and immeasurable. However, opponents of behaviorism claim that learning is much more than changes of behaviors

and not necessarily observable. To some extent, cognitive learning theories make up for the deficiencies of behaviorism.

In cognitive learning theories, rather than external observable behavior's, learning is regarded as an internal process, and how much a learner has mastered relies on the processing capacity of the learner, the depth of the processing and the efforts the learner has made (Craik & Lockhart, 1972; Craik & Tulving, 1975). Learner's existing knowledge structure would influence the end learning result as well (Ausubel, 1974). In the perspective of cognitive learning theory, memory, motivation, thinking and reflection are essential components of learning. Inspired by computer science, cognitivists view learning as a system of information processing.

In recent years, there has been a shift away from cognitivism to constructivism, especially when it comes to online learning. School of constructivism asserts that learners interpret the information and the world according to their personal reality. Learners learn through observation, processing, and interpretation, and then personalize the information into their personal knowledge (Cooper, 1993; Wilson, 1997). Constructivists also stress that learners learn best when they can contextualize what they learn for immediate application and personal meaning (Ally, 2008).

However, behaviorism, cognitivism and constructivism are theories developed when learning was not that influential to technology. In the Web2.0 era, technology has greatly changed people's life style, including how human learn. A recently proposed theory under discussion is connectivism (Downes, 2006; Siemens, 2004). According to Siemens, connectivism is the integration of principles explored by chaos, network, complexity and self-organization theories. Learners live in the digital age featured by

information explosion, which suggests that learners have to fix their old learning patterns and mindset, and the priority is to learn how to select wisely and evaluate critically huge amount of information from various sources. And due to the rapid change of information, learners are usually unable to decide the learning content. They are forced to keep up with the pace of the era and technology, and learn to be a quick learner. In addition, since machines are becoming more and more intelligent, Siemens also asks whether, in fact, learning may reside in machines. Some knowledge will reside in machines while some will reside in humans. Therefore, this brings a new challenge to educators: how to design instructions for both machines and humans, and how humans and machines can interact with each other (Ally, 2008). The application of social software to facilitate online collaborative learning could be the extension of human computer interaction or how machines support human learning and interactions.

Although whether connectivism could be counted as a learning theory is under great debate, the appearance of connectivism suggests that technology is having prevalent power on human's learning. Correspondingly, the learning theories should meet the needs of current social environments. This does not mean that connectivism should replace behaviorism, cognitivism and constructivism to guide learning in Web2.0 Era. In fact, each theory has its advantages and fallacies.

It is better to blend them together to meet the needs of current various and changing learning environments. Actually, there are many overlaps among behaviorist, cognitivist, and constructivist schools of thought. The process of theory development is also based on each other. A certain theory is reflective of the social environments when it was put forward, yet theory also has the characteristics to develop with times, and the

feature of wide application. Therefore, in terms of online collaborative learning experience design, behaviorism, cognitivism, constructivism could all provide effective principles to instructional designers as long as they are contextualized appropriately.

With respect to instructional strategies, Ertmer and Newby (1993) claim that behaviorism, cognitivism and constructivism could be used as taxonomy for learning. Behaviorists' strategies can be used to teach the *what* (facts); cognitive strategies can be used to teach the *how* (processes and principles); and constructivist strategies can be used to teach the *why* (higher-level thinking that promotes personal meaning, and situated and contextual learning). Janicki and Liegle (2001) analyzed different instructional design models to identify the components that support effective design of web-based instructions. They identify components from each of the behaviorist, cognitivist, and constructivist schools of learning, and explore connectivist theory to help designers use it to guide the design of learning materials. The following paragraphs would talk about in detail how these theories could guide online collaborative learning.

Theories to Support Online Collaborative Learning

The above part reviewed the development of major learning theories. This part would focus on the learning theories support online collaborative learning.

Collaborative and cooperative learning should be encouraged to facilitate constructivist learning (Hooper & Hannafin, 1991; Johnson & Johnson, 1996; Palloff & Pratt, 1999). Working with other learners could provide learners with real-life experience of working in a group. Learners could learn from each other and the process of negotiating and communicating during group work is learning itself. (Ally, 2008). In

collaborative learning, each individual's strength could be combined together and they could collaboratively build knowledge, which is more efficient for the advent of knowledge than individuals construct knowledge by themselves.

According to constructivist learning theories, learning should be an active process. Rather than passively accepting knowledge from instructors, learners should actively construct their own knowledge. Knowledge construction is facilitated by good interactive online instruction because in online learning, students control the learning agenda, thus they have to take initiative to learn and to interact with the instructor and their peers. (Murphy & Cifuentes, 2001).

Socio-constructivist approach and socio-cultural approach are two learning theories derived from constructivist learning theories. And they provide valid theoretical foundations for why online collaborative learning should be valued.

Socio-constructivist approach maintains that people learn through cognitive conflicts. Based on their prior experiences, people stored multiple schemas in their mind, which enable people to solve problems with tools for different situations and for completing various tasks and problems. (Dillenbourg, 1999; Weinberger, 2003). Cognitive conflict is the core process of learning, which could be regarded as a triggering event to change people's original knowledge structure. It is also closely related to the search for logical coherence, assimilation and accommodation. (Dillenbourg, 1999, Limón, 2001; Weinberger, 2003)

Social-cultural approach is the other main approach concerning collaborative

learning (Weinberger, 2003). Socio-cultural approach emphasizes the interaction between human being and the social surroundings and also the necessity of having socio-cultural activities. In order to construct knowledge, it is highly important for an individual to develop his ability of using tools, either conceptual or material, such as concepts, formulas, languages, and software etc. These tools share some common characteristics, they are:

- Culturally and historically located
- Modified and developed by each generation because of the changing socio-cultural circumstances
- Accessible to individuals engaging in the practices of their communities
- Serving as the meditation for interactions between individuals and social contexts
- Able to be further developed by people using them

Based on the above, it could be inferred that learning and development is placed in a culturally and historically shaped context. (John-Steiner & Mahn, 1996)

Vygotsky's theories provide further proof for the validity of socio-cultural approach. According to Vygotsky (1978), there are two levels, interpersonal and intrapersonal, where learning takes place. Learning first appears on interpersonal level, which refers to the social level between people and artifacts mediated by conceptual and material tools. The second level where learning process appears on is the intrapersonal level, which is the part of individual understanding and this process is called internalisation. Another important theory concerning online collaborative learning is Zone of Proximal Development (ZPD), which is also put forward by Vygotsky. ZPD

refers to the distance between the levels of the tasks that a student is able to carry out independently and the potential level that the student can accomplish under the guidance of an expert or in collaboration with more capable peers (Säljö, 2001; Silvonon, 2004). So at the beginning, when an individual participate in a learning community, he could learn from the expert or experienced peers, and gradually when he becomes a more capable person in the community, he could also contribute to that community. In this way, a learning community could be supported and continually developed. Individuals in that community could learn more and interact with other members more. Vygotsky's theories indicate that collaborative learning is beneficial for learners and learners could achieve what they might not be able to achieve themselves through collaborative learning.

Besides Vygotsky's theories, another theory named the community of practice also supports collaborative learning very effectively. This theory asserts that learning is based on inter-relations and transactions between individuals, surroundings and culture (Dillon, Wang & Tearle, 2007). Lave and Wenger (1991) defined communities of practice as various communities organized around some common interest, particular activity or knowledge structure of members inside it. Through these shared values, activities, interest, these communities could provide its members a sense of identity and belonging. In the digital world, this identity is called digital identity, an important concept but would not be discussed in detail in this article. Community of practice also indicates that newcomers participate in the activities and learn from more experienced peers, at the same time, new comers also bring their earlier knowledge, skills and ideas to the community. Participation is not a means to an end but learning itself. There is a positive correlation between the quantity of participation and quality of learning. As new

comers participate and learn, gradually, they become the more experienced members of the community and able to help others by bringing their own effort and knowledge to the community. To some extent, the working mechanism of the practice of community is kind of similar to that of the water cycling system: transformation between old and new and sustainable development of a system.

According to Valtonen (2011), although socio-constructivist and socio-cultural approaches describe learning from different angles, they both stress the importance of collaboration activities in the learning process. In socio-cultural theory, collaboration serves as a tool for extending shared understanding and adjustments among participants. In socio-constructivist theory, collaboration assists participants to solve their cognitive conflicts and they learn through cognitive conflicts. Both socio-cultural approach and socio-constructivist approach also put emphasis on the influence of learners' prior knowledge structure and skill sets in helping participants understanding a learning context or contextualizes and personalizes what they have learned.

The above-mentioned theories clarify the importance as well as characteristics of collaborative learning. Connectivist theory reveals why we need online learning environments for collaborative learning. Siemens (2005) suggests that with the development of globalization, our society is becoming more and more networked; information is constantly changing, thus it is extremely necessary for educators to look at new ways to design learning experiences. Connectivist theory is just for the digital age, where individuals learn and work in a networked environment. Current social environments requires learners to:

- Explore and research current information critically
- Be autonomous and independent to build valid and accurate knowledge bases.
- Have the ability to recognize knowledge
- Quickly acquire the new knowledge for a discipline
- Keep up-to-date in the field and be active participants in the network of learning

Therefore, appropriate use of the Internet is an ideal learning strategy in a networked world.

The above theories provide a theoretical foundations and framework for online collaborative learning. In the next part, this article would discuss how to integrate these abstract learning theories into concrete online learning experience design with the support of ICT, especially social software.

Using Social Software to Facilitate Online Collaborative Learning

Information and communications technology (ICT) connects the whole world. Hence, instructional designers could use ICT to design learning environments and learning situations to put learning theories into practice. According to Valtonen (2011), the development of learning with ICT has evolved from software supporting students' individual learning to ICT-supported collaborative learning. Various ICT solutions provide different tools and platforms for collaborative learning. In order to facilitate optimal learning, there is a need to develop a multi-channel system in which learning is delivered by different communication technologies. (Mukhopadhyay & Parhar, 2001). The appearance and popularity of social software could serve as this multi-channel system for learning.

Social software is regarded as an essential feature of Web 2.0 (Alexander, 2006). Users could only read readymade materials pretty passively in traditional webpages while in Web 2.0 era they could actively participate and even generate their own content with tools, such as social software. Social software contains hundreds of tools for various aims (Valtone, 2011). According to White (2007), these tools could be categorized into 10 types based on their common purposes, which are social games, communication tools, file sharing, blogs, social networking, video sharing, collaborative authoring, image sharing, calendaring and social bookmarking. Although there are so many different purposes, the two main features of social software are blogs and wiki-environments and there are common characteristics that connect all social software. The common features are tools for:

- Supporting collaboration
- Providing feedback
- Supporting the sharing of resources
- Communicative and explicit working
- Emphasizing online profiles

(Boyd, 2003; Bryant, 2006; Sinclair, 2007; Alexander, 2006)

Based on above analysis, learners could use social software to collaborate, interact with each other as well as create user-generated content. And these functions of social software go well with the principles of socio-constructivist and socio-cultural theories of learning.

Ferdig (2007) outlines different ways to supporting online collaborative learning

by using social software. Tools of social software provide possibilities for publishing their artifacts of learning and to get feedback and reflection, thus social software could be used to build learning communities. Social software could also be used as a space for collaborative and co-operative learning, where students could actively participate in collaborative activities and build knowledge together. Another major function of social software is providing an environment for scaffolding students at their upper boundaries of zone of proximal development.

The above analysis of social software goes very well with principles of collaborative learning. And according to Stahl et al. (2006), technology used for computer supported collaborative learning (CSCL) should be fundamentally social. Therefore, it could be inferred that social software has great potential to facilitate online collaborative learning.

Conclusion

The first part of this article examines how different schools of learning theories reveal the essence of learning and how learning theories evolve to meet the needs of the society at the time. In its second part, this article explains the reasons why in digital age there is a need and trend to develop online collaborative learning mainly based on socio-constructivist and socio-cultural approaches. The third part of this article clarifies that characteristics of social software go very well with collaborative learning, thus tools of social software has great potential to be used to design online collaborative learning environments. However, due to time limit and the author's level, this article did not discuss the limiting factors of social software and how to use social software to

specifically design optimal learning experiences. And more concrete case studies of using particular social software to address learning issues also need to be examined.

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