Virtual community of safety practice for construction organisations

Imriyas Kamardeen

University of New South Wales

Follow this and additional works at: http://epublications.bond.edu.au/aubea_2011

Recommended Citation

This Conference Paper is brought to you by the 36th Australasian University Building Educators Association (AUBEA) Conference at ePublications@bond. It has been accepted for inclusion in Conference Papers by an authorized administrator of ePublications@bond. For more information, please contact Bond University's Repository Coordinator.
Virtual Community of Safety Practice for Construction Organisations

Imriyas Kamardeen  
Faculty of Built Environment  
University of New South Wales, Sydney, Australia

ABSTRACT
Communities of practice provide a platform for sharing know-how knowledge and experiences amongst employees within an organisation. They could offer a great deal of opportunities and potentials for improving the occupational health and safety performance of builders. However, because construction projects are remote and scattered, and each project has its set completion schedule and progress status, interactions between employees of a construction organisation is minimal. It is nearly impractical to establish a group of professionals from different construction sites who could meet on a regular basis to share safety related experiences and information. Nonetheless, the formation of virtual communities of practice, departing from the conventional model, would alleviate the impediments caused by geographical, time and work pressure constraints. This paper discusses the development of a virtual community of safety practice (VCoSP) for construction organisations, leveraging on the power of web 2.0 technologies. The implementation of VCoSP within a construction organisation could bring about numerous benefits, including: nurturing a strong safety culture within the organisation and helping site professionals continually improve safety competency.

KEYWORDS
occupational health and safety, knowledge management, community of practice, web 2.0

INTRODUCTION
Informal conversations occur all day long among employees in an organisation in the lunchroom, on a coffee break or in corridors. These conversations allow employees to share experiences. The shared experience may be an innovative idea, procedure or an insight into how a person performs a task more effectively and efficiently. These experiences embody expertise and know-how knowledge and are known as tacit knowledge, which becomes an asset for the organisation. Hence, it is crucial for an organisation to create a structure to enable internalisation of this valuable asset. One way to create a structure among employees is to develop a community of practice (Wenger, McDermott & Snyder, 2002). A community of practice is a group of people who share
an interest or passion for something that they know how to do, and who interact regularly in order to learn how to do it better. The primary purpose of communities of practice is to create and share knowledge among participants. Carlsson (2003) quoted that communities of practice enhance and improve effectiveness of both individuals and the organisation. Communities of practice could offer a great deal of opportunities and potentials for improving the occupational health and safety performance of builders. Lingard & Rowlinson (2005) claimed that a construction company may have several professionals and team players. Each professional may have some knowledge and experience in OHS. If these experiences and knowledge were collated and internalised, it could help improve the organisational learning ability and thereby OHS performance. Chua & Goh (2004) argued that in order for the construction industry to improve its poor safety performance, it needs to learn from its mistakes and put the lessons learned to good use. Gherardi & Nicolini (2000) reinforced that safety is situated practice and safety knowledge is culturally mediated by forms of social participations, material working conditions and the negotiated interpretations of actions on site. Safety knowledge is therefore dynamic and profoundly rooted in communities of practice. Safety culture is learnt when joining a community of practice as a distinctive feature of professional identity. Hence, the formation of communities of safety practice, amalgamating professionals from different projects, could facilitate the sharing of tacit OHS knowledge and thereby improving safety performance of the organisation as a whole. Moreover, this could assist the organisation in alleviating the challenges posed by high employee turnover and skill shortages. It is also an effective means of educating new entrants to the community or organisation. Flannery & Hinze (2008) also underpinned that through participations in a safety community of practice, which consists of safety professionals who network regularly through meetings and teleconferences, this type of information could be shared on an ongoing basis. The community could serve as a viable means of getting information on new and proposed regulations, successes related to best practices, new concerns on interest to safety professional, accident reviews, emerging issues or concerns, etc. Another means of getting information would be through inquiries that would be made by individuals to the entire safety community of practice. The application of communities of practice in construction organisations faces a major challenge. Because construction projects are remote and scattered, and each project has its set completion schedule and progress status, interactions between employees of a construction organisation is minimal as opposed to other types of organisations where corridor conversations and coffee/lunch break chats are ordinary norms. Hence, it is nearly impractical to establish a group of safety professionals from different construction sites who could meet on a regular basis to share information of mutual interests. This
situation is also a challenge even for facilitating post accident reviews so as to learn from past mistakes. Nonetheless, the formation of online/virtual communities of practice, departing from the conventional model, leveraging on the power of web 2.0 technologies would alleviate the impediments caused by geographical, time and work pressure constraints. Moreover, the information shared by community members could systematically be archived for future references and to avoid reinventing the wheel. Hence, this paper discusses the development of a virtual community of safety practice (VCoSP) for construction organisations using web 2.0 technologies. Firstly, a review of literatures on communities of practice and virtual communities of practice is provided, followed by a discussion on the process involved in developing the VCoSP. Then the potential benefits of and challenges for the VCoSP is discussed followed by a conclusion.

COMMUNITIES OF PRACTICE
Many definitions are found in the literature for communities of practice. Each definition tells about varying features of communities of practice. Communities of practice (CoPs) are groups of people that share a concern, a set of problems or a passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Wenger et al., 2002). Communities of practice are groups of people who share ideas and insights, help each other solve problems and develop a common practice or approach to the field (McDermott, 1999). Communities of practice are groups that form to share what they know and to learn from one another regarding some aspects of their work (Nickols, 2003). They formalise their existence through the establishment of common goals and values and are often deliberate in their construction and seek to meet predetermined needs which have been identified by their participants (Molphy, Pocknee & Young, 2007). Communities of practice are learning environments. They are groups of people who come together to share with and learn from one another. They are held together by a common interest in a body of knowledge, and are driven by a desire and need to share problems, experiences, insights, templates, tools and best practices (Hubert, Newhouse & Vestal, 2001). CoPs are an intrinsic condition for the existence of knowledge (Kimble & Barlow, 2000). It is a tool for converting implicit knowledge into explicit form of knowledge (Davenport & Prusak, 1998). Knowledge-intensive consulting firms value CoPs as a valid method for knowledge acquisition and transfer. As such, key elements in CoPs are knowledge sharing and learning. The learning that evolved from these communities is collaborative, in which the collaborative knowledge of the community is greater than any individual knowledge. In a CoP environment, a person’s learning is enhanced through engagements with others which enable the extension of that person’s capability to a new,
high level. Wegner (1998) defined that the life cycle of CoPs has five maturity stages as shown in Figure 1.

1. **Potential stage** – involves finding people with similar interests, establishing contacts and building informal relations.
2. **Coalescing stage** – where identity is formed and the values are discussed. Members engage in discussions in the field of interest and move from a loose network to a common sense of purpose.
3. **Active stage** – where CoP becomes highly dynamic and comes into its own by engaging in high level interactions and socialisation. This is where generation of new knowledge, dissemination and learning occur.
4. **Dispersed stage** – members of the community lose interest in the topic, activities reduced and influx of new knowledge is reduced, making the CoP less attractive.
5. **Memorable stage** – here the CoP is dispersed but tales and anecdotes live on for a while. People still associate with the CoP as part of their identity.

**VIRTUAL COMMUNITIES OF PRACTICE**

A Virtual Community of Practice (VCoP) is a network of individuals who share a domain of interest about which they communicate online. The practitioners share experiences, problems and solutions, tools and methodologies online, which contribute to the development of the knowledge of each participant in the community as well as the domain as a whole. VCoPs enhance the learning environment since they allow both synchronous and asynchronous communications, integrate geographically isolated experts with novices, and promote situated learning. Several benefits of VCoPs are identified in the literature.

- Physical location of employees is unimportant and isolation from the peer group is less problematic when employees are scattered geographically. The use of
technology bridges the geographical gaps. Hence, Virtual CoPs enable collaborations, sharing of specialist interests and experience, and access to mentors and like-minded individuals, irrespective of geographical locations.

- Virtual CoPs can afford a combination of synchronous and asynchronous communications and socialisation, access to and from geographically isolated communities, and international information sharing.

- Virtual CoPs and ICTs provide a systematic means for managing knowledge as an asset. Experiences, insights and ideas of people are captured and stored systematically, which can be reused in the future via sound search and retrieval functions.

- Virtual CoPs provide interested professionals with opportunities for collaboration, discussions and debates through networked technologies. This gives them benefits of others’ experiences and often saves themselves reinventing the wheel by finding out what others have done when faced with particular problems.

- Virtual CoPs establish a networked environment where interactions that improve learning can occur. The interactions within these communities focus around knowledge sharing within the membership, who may range from experts to novices. Via the interactions of experts and novices, neo-apprenticeship style learning can occur.

- Using ICT to support the ongoing interactions and activities of CoP members frees the members from constraints of time and space.

Critical success factors

Gannon-Leary & Fontainha (2007) identified nine critical success factors for the existence and evolvement of virtual CoPs and thereby knowledge creation and learning.

1. Virtual CoPs are formed on ICT and Web 2.0 platforms. The success and growth of CoP is heavily relied on the level of technological provision and ICT skills that members posses to support mutual engagement.

2. The evolution of a CoP is reliant upon the effective communication of the members, most easily achieved through face-to-face meetings. Virtual communities transform personal interactions and physical relationships into cyber interactions and electronic relationships. Hence, technology needs to be regarded as an acceptable and transparent means of communication.

3. Consolidate membership and develop trust through effective personal identification modes in the virtual CoP.
4. CoP members must have a sense of belonging: being an insider of the community and actively participating in the activities.

5. A virtual CoP must have a purpose and this purpose must be achievable via ICTs.

6. Consideration needs to be given to the influence of shared repertoire of the community when using ICTs.

7. Usage of user-friendly language and graceful ways of bringing people into conversations.

8. Longevity – time is needed for communication and to build up trust, rapport and a true sense of community.

9. Leadership is important to sustain the community. In the case of virtual CoPs, a moderator, facilitator or a list owner is important.

**Knowledge creation and dissemination in VCoPs**

Knowledge creation, sharing and learning take place through different modes in CoPs. Nonaka and Takeuchi (1995) introduced a four-staged knowledge transfer spiral model that explains the stages and forms of knowledge creation and transfer in an organisational context. These modes include socialisation, externalisation, combination and internalisation. Socialisation is where individuals acquire knowledge from others through shared experience, observation and imitation. Externalisation involves meaningful dialogues and reflections to articulate tacit knowledge into explicit concepts. It also includes a systematic collection and archiving of explicit concepts drawn from different sources for future use by the organisation. The utilisation of the archived knowledge to benefit when faced with knowledge crisis is known as combination. Internalisation refers to the process of learning by doing and verbalising and documenting experiences. Hafeez & Alghata (2007) contextualised these modes of knowledge creation and sharing to Virtual CoPs as summarised below.

- **Socialisation** – where knowledge creation and transfer take place through interactions with experts in virtual chat rooms and in seminars and workshops organised by the community. Also storytelling by CoP members to relate their experiences is a powerful communication tool which helps listeners form ideas and concepts.

- **Externalisation** – where a CoP holds a structured archive or repository that contains all the discussions ever took place since the start of the CoP in a topic-by-topic structure.

- **Combination** – in the combination process, the structured archive that the CoP holds, makes it possible for members to access information over a period of time.
and benefit from the use of “CoP memory” if one is faced with a knowledge crisis situation.

- **Internalisation** – issuing electronic newsletters for promoting event, courses, publications, stories and ideas help in the internalisation of knowledge within the community.

DEVELOPING A VIRTUAL COMMUNITY OF SAFETY PRACTICE (VCOSP) FOR CONSTRUCTION

**Terms of reference**

Flannery & Hinze (2008) recommended valuable terms of reference for a community of safety practice in construction. Their suggestions are listed as follows:

1. A query process is central to the working of the community of safety practice whereby members can post questions for comments and inputs being provided by the other members.
2. In the spirit of sharing safety information freely among all interested parties, the membership to the community should be open to any individuals who are interested in construction OHS. This may include professionals from different types of contractors, designers, researchers and OHS authorities.
3. In the same vein of thought, it could benefit the construction industry to a greater extent if the work products of the community of safety practice can be viewed by the public and pose questions because these could impact significant changes on the overall performance of the construction industry. Adequate efforts should therefore be made to publicise the existence of the community.

From functionalities point of view, Schweitzer (2003), Molphy et al. (2007) and Gannon-Leary & Fontainha (2007) listed important features that should be included in the virtual community of safety practice platform.

1. Discussion boards and email groups for asynchronous threaded discussions
2. Chat and conferencing tools for synchronous discussions
3. Tools for circulating community news among its members
4. Community resources archives/repositories to retain the work products of the community over time
5. Document exchange tools for sharing documents, photos, video clips and mp3 sound
6. Community event manager tools for facilitating face-to-face meetings and forums for community members
7. Quiz/survey/poll tools for getting the views of community members on various issues
8. Blog/notes tools for letting individuals share OHS experiences with other members in the CoSP through written entries
9. Personal identity (virtual business card) tool for creating personal identity or individual biography pages as a way to give contextual information about people. Community members are much more likely to engage in social interactions if they know about the individual they are engaging
10. CoPs should provide a way of searching through their site materials such as documents, blogs, stored threaded discussions, etc.
11. Section based and taxonomy based navigations are important.

Conceptual model of the VCoSP

A conceptual model for the VCSoP was developed, as seen in Figure 2, to address the requirements mentioned in the terms of reference above.

There are four key components in the proposed model for the VCoSP:

1. Online interactions between members of CoSP – these take place in different forms such as seeking information through enquiries, initiating threaded discussions on topics of concern, sharing success stories of applying innovative ideas and conducting online forums and brainstorming sessions.
2. Collaborative construction of new knowledge – by collaborating through various modes of interaction as mentioned above, new OHS knowledge is created.
collaboratively by the members of CoSP and validated collaboratively by them before it is applied on site. The consultation and threaded discussion sessions function to perform the validation exercise of new knowledge automatically.

3. Retaining new OHS knowledge for re-use – new knowledge created by collaborations of members is a valuable asset that adds value to the organisational practices and thereby improves the competitiveness. Hence, this asset should be retained for re-use in the future. The community memory functions as the repository to store this asset in an organised manner.

4. Dynamic learning and competency enhancement – learning among the community members occurs in two modes. First mode is whereby members who participate in the interaction sessions as well as observers learn as new knowledge is created out of these sessions. In the second mode, members can retrieve retained knowledge from the community memory when they are struck by a need to learn. Both of these modes facilitate OHS competency advancement for individual members. And, learning via these modes takes place continually as a dynamic process.

**Developing the online system**

There were three possible options to develop the VCoSP, including: (1) coding using web development languages such as HTML, PHP, Cold Fusion, ASP, JSP etc., (2) using a Contents Management System (CMS) or (3) using a social networking website. It was decided to use Groups feature of Facebook social networking site for this purpose. Facebook Groups is a feature that allows Facebook users to connect, discuss and network with each other within the context of a common interest or topic. The following rationales backed this selection:

1. It is freely available to all and as such organisations of any size would be able to develop a VCoSP.

2. It needs no programming or web development skills to set up and no server or network administration and maintenance are required from the group administrator or the organisation.

3. Construction professionals find it hard to dedicate time to participate in online discussions whether on site or in the office due to work pressure and schedule constraints. It may dilute the potential benefits of the VCoSP should it set up as part of their work. However, if participation in the VCoS is blended with leisure activities of professionals, the group activities are likely to grow overtime. Most people these days have a Facebook account and they check it quite regularly at
their leisure time. A Facebook Group for the VCoSP would make the participation as a fun activity at leisure.

4. No training is needed to use the VCoSP as it is similar to the tools available in Facebook individual profiles and all Facebook users are familiar with these tools.

5. It is very easy to extend the group outside the organisation when it is needed.

6. Facebook is continually introducing new functionalities and the improved functionality of Facebook Groups makes it easier for members to connect, share and collaborate smoothly. The benefits of these improvements will be readily available to the organisation hosting the VCoSP at zero cost.

Creating the VCoSP in Facebook

The VCoSP was created in Facebook Group and Figure 2 depicts the main window of the online platform.

![Figure 3 – VCoSP main window](image-url)

Creating the VCoSP as a Facebook Group essentially involved four key steps as described below.

1. *Creating a Facebook account and logging in:* A Facebook Group cannot be created unless the creator of CoSP is a member of Facebook and logged in.

2. *Creating a group:* Once logged in, clicking on the "Groups" link in the main menu on the left side of the page will open the “Groups” window where the “+Create a Group” button was clicked to create a new group. Once the "+ Create
a Group” button was clicked, a Facebook group creation form appeared which needed to be filled out with basic information such as name of the group, description for the group, type, a slogan for the group (recent news), an address and email contacts for the group. A picture that correctly reflects the theme of the community was also uploaded.

3. **Privacy setting for the group:** Facebook provides many privacy setting facilities as shown in Figure 4. The key privacy setting is the “Access”. There are three access options, namely open group, closed group and secret group. While anyone can join an open group, for closed groups members can join upon administrator’s approval and for secret groups membership is provided only by invitation by the administrator. Depending on the organisational policies, the administrator can select an access type for the VCoP. The administrator can also define who can post materials to the platform. Because the objective of the VCoP is to create and disseminate new knowledge among community members, it was appropriate to permit all members to post materials on the online platform.

4. **Inviting members to the group:** After creating a group and setting the privacy issues, the administrator can invite members to join. Members can be invited either from the Facebook friends list or by adding the email address to the email address box that is directly under the friends list for others those who are not yet on Facebook. Once all these steps were completed, the Facebook group was ready to function as the virtual platform for the community of safety practice.

**Member collaboration and safety knowledge management**

The virtual platform features eight tools for member collaboration and safety knowledge management and they appear as tab controls as seen in Figure 3.

1. **Wall:** The Wall is the central location for recent information posted by community members and it is where up-to-date contents from community activities are kept. When a community member shares contents (videos, photos, notes, etc) on one of the tabs other than the Wall, they will appear on the Wall for high visibility for other members.

2. **Info:** The Info tab lets the community administrator share key information about the community under three areas, known as Basic Info, Contact Info and Recent News. The administrator can share information such as overview, mission and other relevant news in this area.
3. *Discussions:* Discussion board enables community members to initiate and engage in threaded discussions about topics that are of interests at a given time, share experiences with other members in the community through written entries (other members can also write comments on entries) and query other members for information.

4. *Photos:* With the Photos tab, members can upload an unlimited number of photos to the online platform and take photos from personal computers and smart phones. Members can also edit and comment on those photos as appropriately. These photos can be reordered and members can tag their colleagues in them.
5. **Video:** The Video tab provides a high-quality video platform for the community. With Video, members can upload video files, send videos from mobile phones, and record video messages to community members. Additional features include full-screen playback, tagging other colleagues and members in videos and rotating videos.

6. **Events:** The Events tab helps promote community events. It allows simply create an event, add pictures to suite the theme of the event and invite community members to participate. Also, members can RSVP. There are also options to leave the event open to members in the community alone, invite guests and/or open to everyone.

7. **Links:** With Links, members can share anything on the internet by posting it on to the community platform. Members can post websites, blogs, YouTube videos, pieces of news as well as contents on Facebook like photos, videos, events, groups and pages.

8. **Chat:** Facebook Chat is an instant messaging tool. When members of the community log into Facebook, they are automatically logged into Facebook Chat. The chat tool is available at the bottom of Facebook page and it lists members who are online. With Chat, community members can have synchronous discussions.

Apart from these user-centred functionalities, the virtual platform also features administrative functionalities to constantly manage community’s privacy, contents, membership, access level and mass messaging.

**BENEFITS OF AND CHALLENGES FOR THE VCOSP**

The following benefits could be enjoyed by a construction organisation if the VCoSP is set up and all site management team members within the organisation actively participate in its course:

1. Learning from success stories of “how to” and stories of what has not worked.
2. Sharing innovative ideas and technologies that could assist and educate the field safety personnel to work more effectively in the supervision and management of safety.
3. Finding ways to positively influence safe behaviours.
4. Obtaining collaborative opinions from fellow experts on specific issues/questions.
5. Collaborating and sharing strategies to address chronic challenges of diverse workforce, language barrier, skill shortages and poor safety attitude of workers.
7. Identifying and standardising best safety practices for the organisation.
8. Improving safety constructability on site.
9. Staying informed of changes on regulations, policies and procedures concerning safety that may affect obligations of safety professionals.
10. Meaningful changes to current practices might easily be implemented through the community of safety practice.
11. Aiding professionals demonstrate safety leadership in the organisation.
12. Nurturing a strong safety culture within the organisation.
13. Easy to warn and alert safety personnel on different sites of unexpected safety and hazardous concerns such as health issues, radiations, pandemic, etc. on sites.
14. Knowing about leading indicators of safety flaws on site.
15. Getting directions to external sources of information, agencies and guidelines by community members.

Nevertheless the following challenges need to be addressed to ensure the above benefits are reaped:

1. Weak motivation to join the VCoSP and participate in its activities may lead the community to a dying state.
2. The VCoSP needs to work hard to maintain energy and a high degree of participation. Individual members of the community must engage with it in order that it may develop and grow.
3. The VCoSP lacks the opportunity for face-to-face interactions and socialising which can consolidate group membership. Consequently, individuals may fail to engage in the CoP. Trust building is vital for sharing and trust primarily develops through face-to-face interactions. In the virtual environment, identities can remain hidden.
4. Computer skills of members.

CONCLUSIONS
Establishing a virtual community of safety practice within a construction organisation could offer a great deal of opportunities and potentials for improving the occupational health and safety performance of the organisation. On one hand could this function as a platform for competency improvement and capacity building for the employees within the organisation, and on the other hand this could help uplift the safety standard on site. The usage of freely available social networking tools like the Facebook provides a zero cost technology for builders to set up a virtual community of safety practice with very minimal administration efforts. The membership of VCoSP can also be extended to outside the organisational boundary to establish an industry wide community. This would create a strong safety mentorship culture within the industry and help address the chronic
challenges facing the industry, including skill shortages and other human-related causes of poor safety records.

REFERENCES

