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3-31-2009

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Abstract

This paper puts forwards a new way to view how Communities of Practice (CoPs) form in environments that make heavy use of information systems. It uses a concept from Physics to suggest a new type of CoP that can exist in workplaces. In order to do that, the paper uses a simplified taxonomy for CoPs to outline the 'Quantum-CoPs'. These Communities are discussed regarding their behaviour and characteristics, and their potential use as fully developed CoPs. The paper presents some preliminary findings from a semi-structured interview conducted in The Higher Education Academy Psychology Network (UK). These findings are contrasted against the theory discussed and some additional proposals are suggested at the end.

Keywords: Communities of Practice, Knowledge Transfer, Quantum-CoPs, Virtual Working

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Abstract

This paper puts forwards a new way to view how Communities of Practice (CoPs) form in environments that make heavy use of information systems. It uses a concept from Physics to suggest a new type of CoP that can exist in workplaces. In order to do that, the paper uses a simplified taxonomy for CoPs to outline the 'Quantum-CoPs'. These Communities are discussed regarding their behaviour and characteristics, and their potential use as fully developed CoPs. The paper presents some preliminary findings from a semi-structured interview conducted in The Higher Education Academy Psychology Network (UK). These findings are contrasted against the theory discussed and some additional proposals are suggested at the end.

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1.0   Introduction

In a time of financial crisis and economic downturn, the survival of an enterprise is more difficult than before. There are many possible ways to achieve survival, but increasing efficiency and making effective use of existing knowledge is undoubtedly one of them. Knowledge, when properly used, can deliver innovation, can create new products and services and can protect companies and institutions against loss of expertise when employees leave them. Companies are also under increasing pressure to exploit the capacity of Information Systems and Information Technology to meet the same goals. The ability of technology to link individuals across continents and time zones holds the promise of working 24/7 and gaining open access to the best talent that the world can offer.

It is often argued that Communities of Practice (CoPs) (Brown & Duguid, 1991; Lave & Wenger, 1991; Wenger, 1998; Wenger, McDermott, & Snyder, 2002) can help with the management of knowledge that a company or institution has. The original notion of CoPs has evolved to encompass the virtual world, widening the range of possibilities (Kimble & Hildreth, 2005; Kimble, Hildreth, & Wright, 2001). While the idea of using CoPs to manage knowledge is attractive, it is not trouble free. One difficulty that CoPs present is the issue of how to identify these communities, as they are often informal and may not feature on the organizational radar. Nuances in behaviour and functioning sometimes blur the distinction between CoPs and other

groups in the workplace; this is particularly the case when the boundaries of the groups themselves are further blurred by the use of technology to spread their activities across time and space.

This paper is an attempt to provide a better understanding of the nuances between CoPs and other groups in the workplace. It introduces the concept of 'Quantum-CoPs' to describe the way in which CoPs can move in and out of existence. The term is particularly relevant to the early stages of the Community of Practice (CoP) lifecycle and, it will be argued, is particularly relevant to virtual CoPs. The paper will discuss how CoPs can be classified in relation to other organisational groups and propose a new taxonomy. The notion of Quantum-CoPs is introduced and some results from an ongoing study at The Higher Education Academy Psychology Network, UK are examined. The paper concludes with a discussion of the relevance of a new class of CoP to the understanding of how CoPs form in virtual environments.

2.0   Communities of Practice (CoPs)

The term Communities of Practice was originally introduced in 1991 by Wenger and Lave (1991), with the intention of changing our way of thinking about how learning took place. They argued that learning could happen through social contact, within CoPs, where apprentices acquired knowledge via routinely working with experts. The learning comes through informal and natural contact between the members of the community.

In the years that followed, CoPs came under intense scrutiny. Wenger released in 1998 a detailed study of them (Wenger, 1998) and in 2002 a more practical material targeting the managerial audience, giving examples of existent CoPs and advice on how to "nurture" them (Wenger, et al., 2002). A number of different authors analysed the evolution of the concepts (Cox, 2005; Kimble, 2006); compared virtual and collocated CoPs (Ardichvili, Page, & Wentling, 2003; Wasko & Faraj, 2000); criticised them (Lueg, 2000; Roberts, 2006) and produced classifications of them (Andriessen, Soekijad, Veld, A., & Poot, 2001; P. Gongla & Rizzuto, 2001).

Although suffering changes in definitions, some aspects remained immutable throughout the time. These aspects can be summarised with the definition of CoP by Wenger:

"*Communities of Practice are groups of people who 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)

This definition delineates the main characteristics that can be found in any CoP: the *domain*, the *community* and the *practice*:

- *Domain* – formed by the shared field(s) of interest of the community. It aggregates the community's members in a common concern, creating a shared identity, motivating existent members and attracting new ones.
- *Community* – formed by its members. It creates the environment where the members can interact and learn with each other through joint enterprises. It allows the members reinforce their social bond among themselves, developing trust, respect and identity.
- *Practice* – formed by the set of shared knowledge acquired by the community. That knowledge is compounded by the ideas, languages, tools and artefacts created within the community as result of joint enterprises. It is the community's accumulated and shared experience.

The definition of CoPs stands in a model with three principal dimensions of a CoP: *Mutual Engagement*, *Joint Enterprise*, and a *Shared Repertoire* of experiences (Wenger, 1998). The idea is based in the assumption that, as social beings, we always engage in enterprises with persons that share a passion, mutually learning and creating, therefore, a common knowledge.

3.0 Creating Taxonomies for CoPs

As indicated above, nuances in the behaviour and functioning of CoPs can sometimes blur the distinction between CoPs and other groups in the workplace. The use of technology to spread these groups' activities across time and space only confounds this problem. Andriessen et al (2001), for example, looked at the distinction between, task groups, teams and communities using the dimensions of goal, emergence,

durability, form of organisation, membership and supporting technology and identified several, subtly different, forms of on-line CoP.

Classifying CoPs is difficult for several reasons. First, there is no absolute line separating one type from another. One person can conclude that a CoP can be included in one category and another person can include the same CoP in a different one. That is mainly caused by the very complex nature of human beings and consequently, CoPs.

Second, some terms used to classify CoPs evolve over time. What can be the right choice today can have a different meaning tomorrow. The most obvious example here is the way in which the evolution of communication technology has affected our notion of what can be considered a CoP. Nowadays a common scenario is to have communities spread through social networks via the Internet.

Finally, such classification is a very personal way of seeing CoPs. One can argue that CoPs are naturally unique and therefore deny any possibility of classification. Although that last argument can be used, the taxonomy proposed in this work is needed as way to explain how the way of seeing them can sometimes affect their behaviour, implying in adaptations on the strategies to use CoPs as an advantage.

3.1   Identifying dimensions for Communities of Practice

Andriessen et al (2001), used six dimensions in their study of on-line CoPs. In this work, we propose only three: the geographic spread of the community, the stage of the community in its lifecycle and the strength of the relations between its members.

The distinctions of geographic spread were discussed in an earlier paper (Ribeiro & Kimble, 2008). Essentially, the distinction here is not between virtual and non-virtual (i.e. whether or not the community uses information systems as a medium for communication) but on "co-locatedness", (i.e. whether or not the community has the possibility of face-to-face contact if it is needed).

Regarding the stage in the lifecycle, Handley et al (2006) argue that "(…) *there is variation in the choice of descriptive dimensions*", concluding that "(…) *It would*

seem that communities of practice are heterogeneous across several dimensions such as geographic spread, lifecycle and pace of evolution". They argue that individuals participate in several CoPs at the same time, each one with different practices and identity structures (Handley, et al., 2006, p. 647).

Finally, Brown and Duguid (2001) use the concept of *Networks of Practice (NoPs)* to describe groups of people who are geographically separate, and may never get to know each other personally, but who share similar work or interests.   Thus, NoPs share many of the features of CoPs but are organised at a more individual level than CoPs and are based on personal rather than communal social networks.   Using Granovetter's (1973) notion of weak ties, they argue that NoPs are characterised by weak social ties whereas CoPs are characterised by strong social ties. In this view of virtual communities, CoPs are seen as providing an epistemic hub for the wider network.

These arguments are used to create the foundations for a proposed definition of a Quantum CoP.

3.2   Communities of Practice by stage by geographic spread

When Lave and Wenger first described CoPs (Lave & Wenger, 1991), they studied collocated communities.   Their work described small communities of practitioners, but it was mainly concerned with the social learning involved in them (*Legitimate Peripheral Participation*).   After that Wenger and other authors extended the concept of CoPs to a wider range, considering even distributed scenarios (Hildreth & Kimble, 2000; Kimble, et al., 2001; Wenger, et al., 2002).   In summary, it is possible to classify CoPs by location as:

	Members geographically close to each other	Members geographically far from each other
State of CoP	Collocated	Distributed

Table 1.   **CoPs classified by location.**

It is important to highlight that such division is not precise or inflexible. A good example of difficult separation is evident in the modern workplace where members sometimes work in the same location, and sometimes work in a different place

temporally, keeping contact with their original members through Computer Mediate Communication (CMC) – via the Internet. However, sometimes such communications are kept through mobile phones or even conventional landlines.

3.3   Communities of Practice by stage in the lifecycle

Wenger, McDermott and Snyder described in detail in 2002 the lifecycle of a CoP (Wenger, et al., 2002, p. 69). On this description a CoP moves through several phases of energy and visibility, going from *Potential* (less visibility) to *Stewardship* (peak of visibility) until it reaches the *Transformation* phase (end of lifecycle). Those phases can be used to classify a CoP regarding its visibility and energy. However, Gongla and Rizzuto proposed a different evolution model based in the observation of 60 communities from IBM Global Services (P. Gongla & Rizzuto, 2001):

"*Our current evolution model is similar to Wenger's and McDermott's in recognizing formative and growth stages of development. However, the evolution model is not a life-cycle approach. In this evolution model, a community can mature and dissolve at any one of these stages beyond the initial formation level.*" (P. Gongla & Rizzuto, 2001, p. 846)

One can conclude that a CoP evolves from a basic initial stage to a more evolved one in a certain period. Independently of the proposed model, a CoP will develop from an initial stage into an evolved and mature state (fully developed CoP). After that some models will show a decline in the lifespan of the CoP (Wenger, et al., 2002), whereas others will say that they might dissolve at any stage after the initial one (P. Gongla & Rizzuto, 2001).

It is possible that a CoP will exist in a stage that might not be visible or notable to others or their own members, the *hidden* state. Cappe has discussed in detail the stage of hidden collocated CoPs (Cappe, 2008).

In summary, it is possible to classify CoPs by the stage in the lifecycle as:

	CoP in pre-initial state	CoP in initial state	CoP in advanced state
State of CoP	Hidden	Potential	Fully-developed

Table 2.   **CoPs classified by stage in the lifecycle.**

3.4 Communities of Practice by strength of relations among members

As explained above, Brown and Duguid created the concept of *Networks of Practice*, where "(…) *relations among network members are significantly looser than those within a community of practice*" (Brown & Duguid, 2001, p. 205). In such communities, the knowledge still flows in the same way as in normal CoPs or as the authors describe:

"(…) *unlike in communities of practice, most of the people within such a network will never know, know of, or come across one another. And yet they are capable of sharing a great deal of knowledge.*" (Brown & Duguid, 2001, p. 205)

They represent the extreme in the scale of strength of relations among members one CoP can be. At the another extreme sits the normal CoPs described by Wenger in (1998). In between, can be found all possible variations in relationships.

Such relations are important to keep a CoP alive. It is important to remember, though, that a snapshot of the relations among members in a specific time does not imply that it is an immutable situation. In such flexibility resides the potential for development of a CoP. However, there is no set of rules or advices to be followed that will work with each CoP. Each case is a unique case.

In summary, it is possible to classify CoPs by the strength of relations among members as:

	CoP with a loose relation among members	CoP with a strong relation among members
State of CoP	Networks of Practice	Communities of practice

Table 3. **CoPs classified by strength of relations among members.**

4.0 Quantum-CoPs

The analogy with Quantum Mechanics is intended to illustrate the way in which CoPs, particularly virtual CoPs, can repeatedly come into, and drift out of, existence. Quantum Mechanics is an area of Physics that studies the atomic and the subatomic systems. There are many intriguing phenomena within this area, and one in particular

warrants attention: *The Observer-Created Reality.* This principle states that at the quantum level the pure observation of a reality creates such reality. This paper is not intended to discuss Physics, but rather it aims to use the idea of Observer-Created Reality in CoPs; consequently readers who wish to find a more detailed explanation of the principle are referred to Rosenblum & Kuttner (2006).

The similarities between Quantum Mechanics and CoPs start when one looks carefully in workplaces. Paying attention to typical and thoroughly discussed CoPs, one can envisage some of them quite easily. They can be in different states in the lifecycle, they can have different levels of relation among the members and they can be even hidden, although in this last case, a deeper and longer analysis should be required. However, in all cases there is a common aspect: the CoPs are quite constant. They exist all the time and one can detect them at any specific time.

What seems to exist, however, is a different type of CoP. They have the same characteristics that define CoPs as described before (Domain, Community and Practice), but with one profound difference: they appear and disappear with time. They are constant in the sense that their members have frequent contact, but they "disappear" from time to time. Sometimes they are summoned up when a situation requires them.

Those CoPs are just one part of several CoPs in which an individual participates, as discussed before by Handley et al (2006) and foreseen by Wenger (1998). However, as they are sometimes loose Networks of Practice (Brown & Duguid, 2001), they tend to be ignored. Still, they carry significant knowledge (Nonaka, 1991) to show their importance. Such CoPs are sometimes more difficult to notice as they are distributed and virtual. Examples of these can be found in social networks, workplaces and probably on any community that has a group of people working together. Sometimes a person can establish contact with different Quantum-CoPs in a short period due to a problem or issue and return to his/her typical CoP without even noticing.

The similarity with Quantum Mechanics appears again when one notices such CoPs. The fact of noticing changes the state of mind of the member, which can consequently induce changes in the community. A community can exist of such level of

informality that the fact of being revealed can stop its working. That change can lead the Community to disappear. Gongla and Rizzuto already discussed some aspects of this disappearance, although they have been studying fully developed CoPs (Patricia Gongla & Rizzuto, 2004). However, even with the situation where revealing a Quantum-CoP does not cause a disappearance, such community is still different from "common" CoPs. They will probably keep their initial situation of being present only during certain periods. Nevertheless some of them might change to a new type of full CoP, becoming the "Potential CoP" described by Wenger's lifecycle in (2002).

It is important to draw attention to an significant aspect of this issue. It might be difficult to differentiate Quantum-CoPs from certain groups that are formed via specific scenarios, such task groups or teams. Only a carefully analysis can tell for certain whether a community would be a Quantum-CoP or not. All the main characteristics described by Wenger should be present; in addition, the frequency of communications among the members needs to be such that it is not sporadic or casual.

5.0   Can Quantum-CoPs become CoPs?

This question is very complex. As the subject is quite new and has not been discussed before it is difficult to reach a conclusion easily. However, it is possible to imagine some conclusions for it.

Taking the existence of Quantum-CoPs as real, and imagining that their discovery does not disturb such existence, it is possible to imagine that some experiences acquired with normal CoPs can still be used with Quantum-CoPs. Issues discussed by Wenger (Wenger, et al., 2002) and for Gongla and Rizzutto (P. Gongla & Rizzuto, 2001; Patricia Gongla & Rizzuto, 2004) when nurturing new CoPs or avoiding losing these are probably still valid. It is crucial, however, to take into account that characteristics of Quantum-CoPs can influence techniques that work well on normal CoPs. The fact that Quantum-CoPs only establish contact during a certain period can affect models of development that are based on constant feedbacks.

However, as Gongla and Rizzuto states:

"(…) *community development is not a 'one size fits all' proposition. Each community that we observed had its unique 'personality', strengths, and challenges.*" (P. Gongla & Rizzuto, 2001, p. 859)

That statement is important to remember because above all, a CoP is unique in its behaviour.

Another important question is, "Are Quantum-CoPs important for companies and institutions"? The answer is a definitely "yes". As previous studies on CoPs already demonstrated, every community that has the potential to enhance a company or institution through improvements in efficacy and efficiency, or bringing innovations is welcome. Additionally, if we take into account the possibilities involving Virtual Communities of Practice and Distributed Communities of Practice, those Quantum-CoPs become even more important.

Finally, additional studies on this issue are necessary. More unanswered questions can be draw from the thoughts about how to detect, nurture and use Quantum-CoPs.

6.0   Initial results of a case study

A study has been carried at the Higher Education Academy psychology Network, UK. The institution is one of 24 discipline-based centres within the Higher Education Academy in the UK. The Psychology Network supports the teaching and learning of psychology across the UK. A core team, based in York, works with staff, departments, professional bodies and overseas organisations to develop supportive networks and to improve the learning experience of psychology students in Higher Education.

One of the authors (Richard Ribeiro) is employed by the Psychology Network, which has given him a particular insight into the community's internal functioning. As the study is still underway, this section will discuss only the preliminary results.

Initially the case study was targeting the understanding of the forming of Hidden CoPs (Ribeiro & Kimble, 2008). It used Qualitative Research methods via interviews

with open-ended question and Grounded Theory (Corbin & Strauss, 2008) to understand the communities behaviour and functioning. After preliminary analysis, a pattern started to form: during the interviews, almost all the interviewees referred to situations where the interviewee worked with a small group formed by members of Psychology Network and external participants. That group, or community, worked together on a regular basis, but not all the time. They shared similar characteristics to CoPs, defined by Wenger, but they only worked together during specific periods. Usually the members of such communities work in different places and establish contact through email or telephone. On some occasions, some communities have face-to-face meetings, but that is not true for all of them. In general, the members work with different communities in different places (institutions or companies) doing the same period. It seems that some members have a "time slot" allocated to each community that they worked with.

Although in principle one might think that those groups or communities are not CoPs, they have a well-defined domain, a strong sense of community and a well-established practice. They have a shared identity, a common enterprise – or several of them, and they share the acquired knowledge. However, they have some aspects very different from typical CoPs. Although having frequent communications, they spend periods without any contact with each other, probably working with other communities. They are summoned up usually when there is a common enterprise, and the normal process of interaction among members returns.

In contrast, sometimes the interviewees related working with external people only once or twice due to a specific task. Sometimes they worked with companies that provided a contact person to complete a task. Some of them also have a regular contact with persons that are the interface for some companies, and work together to accomplish a task. In all those cases, it is clear that those groups are not CoPs. They do not have identity, they do not share a repertoire and they do not share a passion for what they are doing.

It is evident that additional studies are needed in the available data. Supplementary confirmation about the possible Quantum-CoPs existent in the Psychology Network is

due. However, the prospect of the existence of those not-seen CoPs is already a good reason for additional studies.

7.0   Conclusions

The work described on this paper is only the preliminary step in the study of Quantum-CoPs. The possibilities are too large to leave unanswered questions. If it is confirmed that these CoPs exist normally in workplaces, but are in a quantum level of existence, then it is worth spending a great deal of time to study them more deeply.

It is important, however, to remember that as with Quantum Mechanics, when observed, these Communities "come to existence". That means that internal aspects related to their behaviour will change, changing consequently, the way in which members see themselves (the community's identity). This warning does not contain a negative side; rather it serves only as a reminder that the community being studied is different from common CoPs.

Also similarly again to Quantum Mechanics, the fact that Quantum-CoPs will be "created" by observation of them can represent an extra set of possibilities for the improvement of a company or institution. Quantum-CoPs can bring the same potential benefits to their host that any CoP. These are so similar to the originally studied CoPs that the same causes that can make a normal CoP fail can also make a Quantum-CoP fail.

On the other hand, the search for Quantum-CoPs can lead to the "discovery" of ghost-CoPs. If not carefully conducted, an analysis can mistakenly recognise teams, workgroups or specially defined groups as Quantum-CoPs. If searching for normal CoPs is not an easy task, searching for Quantum-CoPs can be even harder. However, the benefits outnumber the problems.

It is clear that this study is only a small step in what can be a big topic in the future. More analysis and case studies are necessary to verify the possibilities and to confirm that Quantum-CoPs are common to organisations. However, the prospect of their existence already creates a great expectation of possibilities.

In future studies it might be necessary to use different techniques or research methodologies to confirm their existence. However, if confirmed, a new range of studies can be undertaken: going from searching methods to development methodologies to help the completion of their potential.

Acknowledgements

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