

Classifying Communities for Design

A Review of the Continuum from CoIs to CoPs

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Abstract. Cooperative design is a complex process that usually involves participants from different cultural and social domains, with different backgrounds and experiences. In this context, the need for social structures that support sharing and common understanding is an essential requirement. The response to such a need can be found in the creation of ‘Communities of Practices’ and ‘Communities of Interest’. Both types of structures have successfully and extensively been applied in different domains; however, a detailed analysis of these concepts points up the need for additional research that leads to their application to cooperative design. This chapter presents a review of the ‘Communities of Practices’ and ‘Communities of Interest’ concepts in order to propose a systematic process for classifying communities. This process might allow practitioners to identify which kind of structure is more suitable to support specific cooperative design processes.

1 Introduction

Sharing and common understanding are common activities in open source development. In such a domain, a community of software developers cooperatively construct systems to help solve problems of shared interest. Using open source development as a successful model for cooperative design, it is possible to highlight the creation of both ‘Communities of Practice’ (CoPs) and ‘Communities of Interest’ (CoIs) as significant organizations to support cooperative design [1].

One of the most accepted definitions for CoP is “a group 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” [2]. Nevertheless, other authors, such as Hildreth and Kimble [3], understand this structure in a very different way, pointing out the professional experience of community members as the essential aspect to conform a CoP. Similarly it is possible to collect several different CoI definitions [1, 2]. As a consequence, there is not a universally accepted criterion about what CoPs and CoIs mean, when they must be applied, or how they should be supported; on the opposite, distinction between

these structures exists in varying degrees, "they are not black and white" [2] entities, and the space from CoPs to CoIs should therefore be understood as a continuum.

Different kinds of communities have different needs and they also have to be managed in different ways. For that reason, it is essential to understand what kind of particular community should be defined as a way of effectively supporting the cooperative design process. With the goal of achieving this purpose, this chapter aims to deepen knowledge about these structures, firstly reviewing the CoP and CoI concepts, and secondly analysing their characteristics and aspects to provide a community model. The resulting systematic process for classifying structures within the continuum from CoPs to CoIs is discussed. The final section compiles conclusions and further work.

2 Reviewing concepts of community

There is not a unique or uniform classification of the different kinds of communities. McDermott [4] classifies communities based on the degree of connection and shared identity among members. He distinguishes among user groups, communities of interest, and communities of practice. There are also classifications based on the purpose. For instance, Carotenuto et al [5] see a landscape of communities formed by communities of practice, communities of interest, communities of purpose, and communities of passion. Allen [6] classifies communities into two types, 'internal and extended communities of practice' and 'knowledge and business networks'. Fischer [7] simplifies the space and just identifies two kinds of design community: communities of practice and communities of interest. Wenger et al [2] distinguish between CoPs and other complementary structures: formal departments, operational teams, project teams, communities of interest, and informal networks. Thus, there is no single uniform criterion to distinguish different types of communities. However, communities of practice and communities of interest can be found as different structures in most classifications. In this section, a review of these two structures is presented.

2.1 Reviewing the CoP concept

CoPs are a well-studied topic with a large number of publications. Nevertheless, each one of these publications has a particular point of view and a different way to understand the definition space of a community of practice. In addition, the use of term 'community of practice' has not been uniform [8]. Sometimes it is a conceptual way to express the social construction of meaning in a group. At other times it is used to refer to a community or informal group sponsored by an organization to

facilitate learning or knowledge exchange. The usage of the term has been very diverse. In this section, the CoP concept and its evolution will be reviewed.

Wenger (1998) [9] understands a CoP as a special type of community where practice is a source of the coherence to pursue a joint enterprise. In this work, CoPs are defined by the following three features: (i) mutual engagement, (ii) joint enterprises, and (iii) shared repository. Later, he redefines the concept of community of practice, explaining that it is not just a collection of best practices, "it is a group of people who interact, learn together, build relationships, and in the process develop a sense of belonging and mutual commitment. Having others who share your overall view of the domain and yet bring their individual perspectives on any given problem creates a social learning system that goes beyond the sum of its parts." [2]. In this definition we can notice that Wenger's community of practice concept has evolved. In 1998 Wenger explains a community of practice as the collaborative space for workers to pursue a joint enterprise creating a shared repository of practices. He explains it describing the daily work routine in a claim processor office. However, in 2002 Wenger's definition is different. It is a group of people interested in the same thing, not just to pursue a common enterprise. Interest is focused on learning together and sharing ideas, not just on doing some particular job. According to Cox [8] this change is "a popularisation and a simplification but also a commodification of the idea of community of practice".

A community of practice is redefined by Wenger along three dimensions that combine the three fundamental elements: "(i) a domain of knowledge; (ii) a community of people who care about this domain; and (iii) the shared practice that they are developing to be effective in their domain" [2]. Based on all these ideas, Wenger et al [2] propose a brief definition of a CoP that is one of the most accepted one: "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". Keywords of this definition are "passion" which denotes voluntary participation, "deepen their knowledge and expertise" which can be translated to learning, and "interacting" which is the process that the "group of people" performs in order to learn. In this definition the bidirectionality of the learning process is missed. They want to "deepen their knowledge and expertise" (learn), but also they want to share their knowledge to develop practice.

In addition, other important definitions are proposed by Hildreth and Kimble [3], and Fischer [7]. Based on Wenger's (1998) definition [9], Fischer understands a CoP as a "group of practitioners who work as a community in a certain domain undertaking similar work" [7]. On the other hand, Hildreth and Kimble define a CoP as a "a group of professionals informally bound to one another through exposure to a common class of problems, common pursuit of solutions, and thereby themselves embodying a store of knowledge" [3].

	Fischer (2001)	Wenger et al(2002)	Hildreth and Kimble (2004)
Definition	A group of practitioners who work as a community in a certain domain undertaking similar work	A group 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	A group of professionals informally bound to one another through exposure to a common class of problems, common pursuit of solutions, and thereby themselves embodying a store of knowledge
Members	A group of practitioners	A group of people	A group of professionals
What holds them together?	A common expertise about a certain domain	Share a concern, a set of problems, or a passion about a topic	Exposure to a common class of problems, common pursuit of solutions
Purpose	Undertaking similar work	Members deepen their knowledge in this area	Embodying a store of knowledge

Table 2.1. Comparative CoP concepts.

Table 2.1, summarizes the differences among the Fischer (2001) [7], Wenger et al (2002) [2], and Hildreth & Kimble (2004) [3] conceptions. Firstly, while Wenger et al understand a CoP as a group of people, Hildreth & Kimble understand it as a group of professionals. More close to this idea is Fischer's definition, encompassing a group of practitioners with expertise in a particular domain. According to Fischer, and Hildreth & Kimble, membership depends just on expertise and includes only people who have a high degree of expertise could belong to the community. Wenger et al see CoP membership as depending also on members' passion about the community domain. For that reason, in their opinion passion about the community domain is essential to hold members together. In contrast, solving common problems is the main reason to hold members together for Hildreth & Kimble. In terms of purpose, according to Wenger et al, the purpose of a CoP is to deepen members' knowledge and expertise in the area, which means they belong to the community because they want to learn. Nevertheless, Hildreth & Kimble's CoP purpose is more complex because it consists of "embodying a store of knowledge", including contributing knowledge. Fischer points out a more practical purpose related to undertaking similar work within the community.

2.2 Reviewing the CoI concept

Not all communities are communities of practice [2]. An interesting kind of community used for cooperative design is communities of interest (CoI). A community of interest is a group of people who share a common interest and who want access

to community information [2]. This common interest is usually a shared goal in the framing and resolution of a problem [7] or just to be informed [2]. CoI membership is usually open, everybody who is interested in the information that is managed by the community can access it [2]. Individuals are involved in the community in an adhoc manner [10], when they want to exchange questions and solutions about the common interest [4]. This exchange among community members produces mutual needs that are the motivation to hold them together [11].

For Fischer [1] CoIs are heterogeneous design communities that can be composed of different CoPs that share a common interest. However, a CoI has a lesser level of formality than a CoP. Relaxing this formality level, CoIs have a great potential to be more innovative and creative [1]. CoI members do not have a strong identity because relationships are always shifting and changing [12].

In conclusion, a community of interest is a different structure than a community of practice. A CoI is characterized by a shared common interest and its purpose is that everybody interested can access and exchange information. CoI members hold together because they want to be informed.

3. Community model: a continuum from CoP to CoI

The analysis of the CoP and CoI concept has shown that there is not a uniform criterion about when these structures should be used, and how they should be supported. Nevertheless, it seems quite clear that it is possible to define a set of characteristics that determines whether a social structure conforms to a community type. The analysis of these characteristics allows systematizing the classification process. This section defines a model for the continuum from CoPs to CoIs, establishing the scope of the model and a set of characteristics to distinguish among different types of communities.

3.1 Scope

There is a large variety of communities. For that reason, it is necessary to determine the scope, limiting the model to the continuum space from the CoPs to CoIs. Level of formality is one of the most promising features to distinguish between CoPs and CoIs. Based on level of formality we could design a first approach to the problem. This approach can be defined by a scale where we would locate CoP and CoI concepts (Fig 3.1). At the left of the CoP concept, we would find structures whose skeleton is rigid and determined by the organization that supports them, such as business units, formal departments or project teams. We will refer to this zone as zone 1. On the other hand, at the right of the CoI concept, we would find flexible and informal structures that are out of our established range, for instance

informal networks. We will refer to this as zone 2. Then, our problem space is situated in the scale between these two end points.

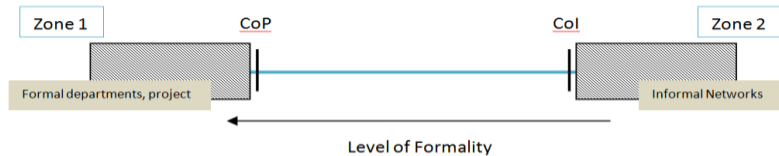


Fig. 3.1. First approach of the problem

In zone 1 we find structures more formal than CoPs. We are able to distinguish any of these structures from a CoP. The following features are indicators of structures more formal than CoPs that would be located in zone 1:

- Domain and enterprise are clear, closed and it is imposed by the organization that supports it. There is not a joint enterprise that it is negotiated by community members. (An example might be the organization of volunteers in the Red Cross). In a CoP the enterprise "is never fully determined by an outside mandate, by a prescription or by any individual participant" [9].
- The primary purpose is to deliver a product or accomplish a task. A CoP is focused on developing practice, expanding and exchanging knowledge about a specific domain. A domain is different from a task. It is an area of shared common interest that the community explores while it is developing its practice. This does not mean that a CoP cannot have a specific goal but its primary scope is to encourage knowledge and learning.
- Roles and relationships are established by the organization. In a CoP leadership can be emergent or assigned. However, a CoP leader "brings people together and enables the community to find its direction" [2]. It is not possible that the organization or the particular leader decides the member's power and relationships of a community member. In a CoP members' power depends on participation, passion for the domain and expertise. An expert usually has more power than a novice but this power comes from the ability to contribute to the community, not from formal authority. Relationships are based on mutual engagement and they grow through mutual interest. For that reason roles and relationships cannot be closely defined nor depend on institutional affiliation.
- Boundaries are extremely clear. In a CoP boundaries are fuzzy [2].

Summarizing all these ideas, CoPs will differ from any structure of zone 1 because they are more connected, informal and self-managed than these structures, even when they are institutionalized. They have joint enterprises and their membership is based on participation, passion and expertise more than institutional affiliation [2].

On the opposite point we observe zone 2, where we can find structures more informal that can be determined based on the following guidelines:

- There is not a shared common interest. People access these structures just for communicating with friends or business acquaintances.
- The main purpose is just to pass and receive specific information. Besides this information does not correspond to a particular common interest. It is business information or information just to know who is who in the community. However, the purpose of a CoI is to be informed about the common interest of the community.
- There are no boundaries. Although they are fuzzy, a CoI has boundaries [2]. An example might be an unmoderated listserve to which anyone may belong, or the followers of an entity on Twitter.

In conclusion while a CoI is a structure whose purpose is to be informed about a shared common interest or concern, more informal structures located in zone 2 are just a set of relationships whose purpose is to disseminate specific information.

3.2 Characteristics

The proposed model is based on a set of features useful to identify differences within the continuum from CoP to CoI concepts. However, not all of these have the same degree of importance. There are a set of features that are identified as fundamental elements to distinguish between a CoP and a CoI [2, 9]:

- **Purpose of the community.** This refers to the general main scope of the community. It is established by Wenger as a key factor in the comparison between CoPs and other structures [2,11].
 - CoP: the purpose of a CoP is to create, extend and exchange knowledge in order to learn and develop individual capabilities. It is also related to learning through sharing best practices. Finally, a CoP's purpose is focused on developing practice by expanding and exchanging knowledge about a specific domain.
 - CoI: the purpose of a CoI is less specific. It consists of being informed, discussing and sharing understanding about a particular topic, problem or concern that interests community members.
- **What is the community about?** The community is interested in something. In this feature we analyze what is 'this something'.
 - CoP: according to Wenger, a CoP is about a specific domain of knowledge [2]. The enterprise of the community is negotiated by community members based on this domain of knowledge and community members develop their practices about this specific and shared domain. Wenger identifies this process as joint enterprise [9].
 - CoI: do not have an enterprise nor a domain of knowledge. CoIs are about a shared common interest formed by multiples domain [1].

- **How does the community function?** This means how the community regulates the activity and members' interactions.
 - CoP: a CoP has to encourage participation and interaction, building a collaborative relationship based on negotiated rules. It is determined by Wenger as including mutual engagement [9] and the community concept [2]. This mutual engagement generates an atmosphere of openness to facilitate learning.
 - CoI: a CoI does not have any regulated function. There is no specific way to build either a collaborative relationship or negotiated rules. As a result, it is a more suitable structure to encourage creativity and innovation.
- **If the community produces any capability.** Does the community produce or support a specific practice?
 - CoP: it is required that a CoP develop a specific shared practice about the domain of knowledge. Wenger identifies this feature as the shared repository [9] and the shared practice [2, 6]. Hildreth and Kimble speak about the store of knowledge [3]. Practice should capture tacit and explicit interactions and it has to be useful for practitioners.
 - CoI: it is not necessary that CoIs develop a practice.

Characteristic	CoP	CoI
Purpose	To create, extend and exchange knowledge to learn and develop individual capabilities. Learning and sharing best practices.	To be informed, discuss and share understanding about a specific topic or concern that interests the community members
What is it about?	Joint enterprise about a specific domain of knowledge	No enterprise. There is a shared common interest formed by multiple domains
How does it function?	Mutual engagement builds a collaborative relationship based on negotiated rules	It is not regulated. Suitable to encourage creativity and innovation
Produce any capability	Shared repository of common resources that serve as future practice. Store of knowledge	Not necessary

Table 3.1. Summary of fundamental elements to compare CoPs & CoIs

On the other hand, there exist other features that, although they are not fundamental to identify the kind of community, are very useful to adjust the classification:

- **Who belongs to the community.** This means what kind of people belong to the community and upon what this process depends.
 - CoP: membership can be self-selected or partially assigned but always based on expertise and passion for the topic [2]. People cannot belong

- to the community just because it is mandatory. They have to feel a personal passion or expertise about the topic developed by the community.
- CoI: whoever is interested in the common shared topic or concern of the community can join. This structure could bring together stakeholders from different domains and even CoPs [1], collecting different perspectives and enhancing diversity.
- **What holds community members together.** This means what is the reason that community members hold together and collaborate.
- CoP: CoP members start to belong to the community because of personal passion or expertise about the topic developed by the community. Then they hold together because they continue having this passion and also they develop a commitment and identification with the group of people who form the community and their expertise [2, 9].
 - CoI: CoI members hold together just because they want access to information and participation about a collective interest or concern with the resolution of a particular problem.
- **On what is the community membership based?** This means on what features or characteristics the community members level of engagement is based.
- CoP: in a CoP, newcomers and old-timers have different degrees of membership [13]. This level of engagement is based on participation, expertise and passion for the topic.
 - CoI: it is dynamic and based just on participation. Because CoIs are structures formed by stakeholders from multiples domains, they are considered both experts and novices at the same time: they are experts when they communicate their knowledge to others, and they are novices when they learn from others who are experts in domains outside of their own knowledge [14].
- **Composition of the community.** Is the community more or less heterogeneous or homogeneous?
- CoP: a CoP is usually a more homogeneous community than a CoI. Although in a CoP it is not unusual to find diversity, this diversity will always be less than in a CoI. CoP members share a common expertise or passion about a specific topic. They work as a community in a certain domain undertaking similar work [9].
 - CoI: CoIs are usually heterogeneous communities [7]. In fact, a CoI can be composed of different CoPs that share just a common interest or concern.
- **Lifespan of the community.** It means how the community evolves over time and how long its estimated duration is.

- CoP: evolve and end organically [2]. Although, there is not a specific default lifespan, CoPs usually have a longer lifespan than CoIs.
- CoI: as with CoPs, CoIs evolve and end organically [2]. However, CoIs are usually more temporary than CoPs [7] because they come together in the context of a specific common interest and when this interest becomes less important, the community tend to dissolve itself.

Characteristic	CoP	CoI
Who belongs?	It is based on expertise and passion for the topic	Whoever is interested in the common shared topic or concern. Stakeholders from different domains
What holds them together?	Commitment, identification with the group, expertise	Access to information and participation about a collective interest, or concern with the resolution of a particular problem
Membership	Depends on expertise, passion for the topic and participation	Dynamic and depends only on participation
Heterogeneous or homogeneous?	More homogeneous because there is a common expertise or passion for a specific topic	Heterogeneous
Lifespan	Evolve and end organically. They are usually longer-lived than CoIs	Evolve and end organically. More temporary

Table 3.2 Summary of “not fundamental” elements to compare CoPs & CoIs.

4 Classification process

Based on the previously determined characteristics, a systematic process has been defined for classifying communities within the continuum space from CoPs to CoIs. This process, apart from the discarded areas established above, contains three main zones: structures that resemble CoPs, structures that resemble CoIs, and fuzzy structures somewhere in between.

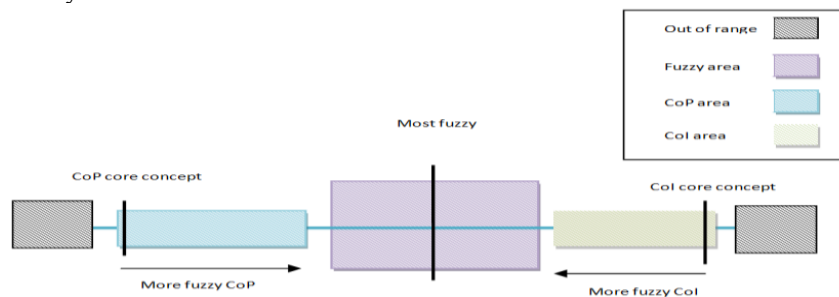


Fig 4.1 Scale: a continuum space from CoP to CoI.

The first area corresponds to structures that resemble CoPs. This means that in this area we will find structures which satisfy fundamental principles already identified for CoPs. The opposite area corresponds to structures that resemble CoIs. These structures must satisfy fundamental principles already identified for CoIs. Finally, between these two areas, we find a fuzzy area composed of structures which do not satisfy all fundamental principles for either CoPs or CoIs. After we have situated the structure in one of the three areas defined in the scale, the “not-fundamental” principles will serve to adjust the accuracy of the classification by situating the structures more or less right or left inside this area.

Based on this idea we propose a process to situate a specific structure in the continuum space from CoPs to CoIs. The model is defined by three stages. The first stage is to check that the structure we want to situate is not out of the limits of our scale. The second stage consists of situating the structure in the suitable scale area and the third stage adjusts the accuracy inside this area.

Once we have checked that the structure is inside the limits of our scale, we will move to stage two. This second stage is the most important one. In this stage, we will assess the specific structure we want to situate based on the fundamental principles described above. Afterwards we will be in one of these three scenarios:

- Satisfy all fundamental principles for CoPs. In that case, we would have a structure that resembles a CoP (left blue area in Fig 4.1).
- Satisfy all fundamental principles for CoIs. In that case, we would have a structure that resembles a CoI (right green area in Fig 4.1).
- The structure does not satisfy all fundamental principles for either CoPs or CoIs; for instance, a structure that satisfies three principles for a CoP and one for a CoI. In that case the structure would be in the fuzzy area (middle violet in Fig 4.1).

Finally, in stage three we will adjust the position in the scale within the stage two selected area. For accomplishing that, we will use the “not fundamental” principles defined above. Firstly, we will divide the stage two selected area into a specific number of parts. This number is determined by the number of principles that apply. It is possible that all of the “not fundamental” principles cannot be applied. For instance, if you are situating a structure that has been recently created, maybe you will not be able to identify its lifespan (it is one of the “not fundamental” principles). When you have divided the area you will take into account the number of not fundamental principles that the particular structure satisfies. Based on this number we will situate the structure this number of positions more left (satisfies more CoP “not fundamental” principles) or right (satisfies more CoI “not fundamental” principles). In order to explain better this stage we are going to divide the problem into three categories, depending on the area selected in the stage before:

- **Case 1, CoP area.** Imagine you can apply all “not fundamental” principles. Before performing stage 2, a structure would be situated at the highest point to the right (point 0, Fig 4.2). We will check how many “not fundamental” principles for CoPs satisfy the particular structure. If none, the structure would be at the starting point (point 0, Fig 4.2), if it satisfies one

it would be a bit more left (point 1, Fig 4.2). Then it would be the same process until one checks if it satisfies all principles. If the structure satisfies all the “not fundamental” principles it would be in the CoP core concept (point 4, Fig 4.2).

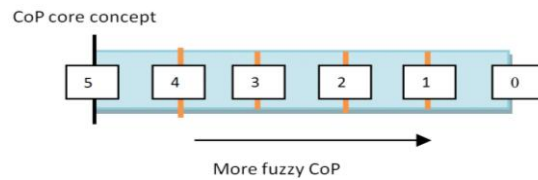


Fig. 4.2. Stage 3 for CoP area

- **Case 2, CoI area.** Imagining we could apply all not fundamental principles, the process would then be the same as case 1 but in the opposite direction and taking into account if the structure satisfies CoI not fundamental principles.

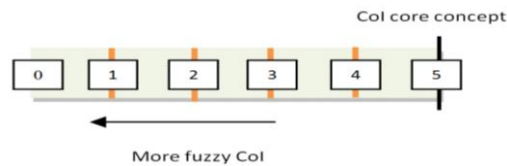


Fig. 4.3. Stage 3 for CoI area

- **Case 3, fuzzy area.** Imagine you can apply all not fundamental principles; you will divide the fuzzy area into double the number of "not fundamental" principles (10 parts). Before performing stage 2, a structure would be situated at the middle (point 5, Fig 4.4). We will check how many not fundamental principles for CoPs and CoIs satisfy the particular structure. For each principle that the particular structure satisfies for CoPs we will add one to the actual point (Remember that the initial point is 5). On the other hand, for each principle that it satisfies for CoIs we will subtract one point.

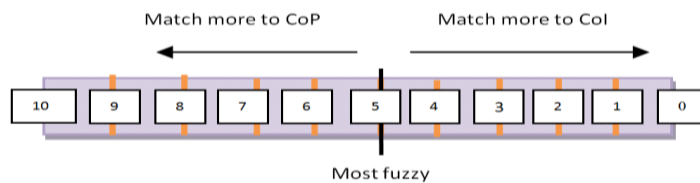


Fig. 4.4. Stage 3 for fuzzy area

Based on theoretical points, the scale proposed provides an effective way to situate a community in one of the proposed areas (CoP area, CoI area or fuzzy area). However, we must highlight that this scale provides an approximate position inside the selected area. Further work could be related to improving the accuracy in-

side the selected area by providing different weights to each not fundamental principle according to its importance.

5 Conclusions

Complexity of cooperative design problems requires communities to address them [14]. In this sense this work has reviewed and analyzed two effective forms of organization to cooperate and share knowledge, namely Communities of Practice (CoP) and Communities of Interest (CoI). The review of both concepts has shown the lack of a uniform and universally accepted criteria about what these structures mean. Furthermore, the defining characteristics of these structures establish a continuum model from CoP to CoI. Based on these characteristics, this work presents a systematic process aimed at classifying a particular community.

This systematic process allows practitioners to identify which kind of community is more suitable to support a specific cooperative design process. In terms of collaborative or cooperative design, the CoP could be a better candidate than the CoI. CoPs have a definite goal and set of tasks to be supported, and tend to be longer lived, so that investment in custom software is worthwhile. They have a body of knowledge that needs to be organized into a framework that will allow it to be added to, modified, and rated by members. But, since they have a definite social structure and roles, it is important to identify leaders within the CoP and to include them in the design and evaluation process.

Nevertheless, in some particular cases, the CoI could also be a good structure for cooperative design. CoIs have a great potential for creativity and innovation, gathering different perspectives and backgrounds to explore a new solution [14].

In conclusion, each of these structures could be suitable, depending on the particular features of the specific design process. For instance, a cooperative design to create a new and innovative artefact will need a structure to encourage creativity, diversity and exploration of alternatives in breadth. In this case, it could seem more suitable to rely on the idea of CoIs as a structure to support cooperative design. However, a cooperative design to refine an existing artefact will need an initial well-established knowledge of the existing artefact and examination of the problem in depth. This is more related to the idea of CoPs.

Future work could include studying the different ways that practitioners perform cooperative design, providing a taxonomy for communities of design.

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