

Rapid literature review into Evaluations of Communities of Practice

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Executive Summary

This rapid review of literature focusses on evaluations of communities of practice to help inform future evaluations of the Healthy Ageing Challenge Community of Practice managed by the Centre for Ageing Better on behalf of UKRI.

The early conceptualisation of communities of practice saw them as spontaneous and self-organised structures, which emerged through organic interactions. However, increasingly it has been recognised that these communities can be managed with resources given for their development. A key consequence of the concept that communities of practice can be managed and investment in associated resources, is that communities of practice should be evaluated to assess their impact and understand what determines their effectiveness.

Overall, the review highlights that whilst there is considerable interest in communities of practice and the possibilities of evaluating them, evaluations are not particularly developed. Consequently, this rapid review only found a small number of evaluations of communities of practice available. This initial literature search suggests that many communities of practice do not produce evaluation reports, or if they do they are not published on publicly available platforms. However, there may be more that could not be found due to a lack of accessibility of the publications (this highlights the importance in the case of the Healthy Ageing Challenge Community of Practice evaluation to disseminate findings on a publicly available platform and in open access journals to aid the dissemination of learning around evaluating communities of practice).

The rapid review found that evaluations of communities of practice, where they exist, are of varying depth and quality, using a variety of approaches and methods.

Therefore, despite the high level of interest in communities of practice's capacity for knowledge sharing, approaches to evaluation are under-developed. This is partly due to the field still developing, and also the inherent nature of what communities of practice are about – communities of practice are complex social systems, that vary considerably in terms of size, context, scope, maturity and purpose.

Therefore, evaluation of communities of practice presents inherent challenges, especially when it comes to learning from the limited and often not transferable practice that currently exists.

The literature does suggest some helpful design principles for evaluating communities of practice, including:

- Use of a theory of change approach to outline expectations around how the community of practice will work and lead to positive change, drawing on emerging thinking in the literature as well as being grounded in the specific context of the community of practice under consideration.
- Conducting both process/learning evaluative approaches, as well as outcomes/impact evaluation to assess the effectiveness as well as identify the factors that make a community of practice effective.
- Use of mixed methodology, including quantitative and qualitative measures, case studies and stories.
- Developing agreed success measures at the outset to monitor and measure impact over time.

Overview

This literature review represents a rapid assessment of the current literature regarding evaluations of Communities of Practice (CoP) (it is not designed to cover the theory underpinning communities of practice, beyond providing initial context). The literature review draws on academic and grey literature (see appendix 1 for a summary), the focus is on developing workable and practical reflections that will aid the development of the evaluation of the Healthy Ageing Challenge Community of Practice, managed by the Centre for Ageing Better on behalf of UKRI.

Whilst the concept of Communities of Practice is well established (Lave & Wenger, 1991; Wenger, 1999), the evaluation methodologies of Communities of Practice are still emerging (Braithwaite *et al.*, 2009; Fulgenzi, Brouwer, Baker, & Frijns, 2020; McKellar, 2019; McKellar, Pitzul, Yi, & Cole, 2014; van Winkelen, 2016). As this literature review indicates, there are some interesting examples of evaluations of communities of practice, a number of frameworks have been developed (S. Lee, Hong, & Suh, 2016; Wenger-Trayner, Wenger-Trayner, Cameron, Eryigit-Madzwamuse, & Hart, 2019; Wenger, Trayner, & De Laat, 2011) or indicators (Wenger, 1999), that can be developed into an evaluation framework.

This literature review outlines examples of interesting practice around evaluation of CoPs and potential avenues to develop evaluations of CoPs. Twelve evaluations of Communities of Practice were reviewed for this literature review (see appendix 2 for a summary) as well as key academic texts. It provides a solid outline of approaches to inform and inspire the evaluation of the Healthy Ageing Challenge Community of Practice, however, this literature review cannot be seen as a comprehensive overview of the topic, given the rapid evidence assessment nature of the task.

What is a Community of Practice?

Communities of practice (CoP) are formal or informal groups of people sharing a common interest usually around a craft or profession. CoPs may form naturally as practitioners interact together or may be formed deliberately. The aim of a CoP is to share learning, exchange and advance knowledge, and support peers within the group. The concept originated with the work of Lave and Wenger (1991) on the concept of situated learning. Rather than seeing learning as an individual phenomenon, where knowledge is bounded in the head of a single person, Lave and Wenger postulated that learning is a result of social action and engagement in practice.

Lave and Wenger (1991, p. 98) define a community of practice as: “a system of relationships between people, activities, and the world; developing with time, and in relation to other tangential and overlapping communities of practice. Community implies participation in an activity system about which participants share understandings concerning what they are doing and what that means for their lives and for their communities” (1991, p. 98).

This approach was further developed by Wenger (1999), who saw CoPs as a social group cohering through *mutual engagement* on a *joint enterprise* and creating a shared *repertoire* of communal resources. The joint enterprise – or domain of interest - shapes the identity of the community and brings people together around a particular knowledge or activity. Being a member of a community is thus defined by the domain, and competence around the domain is key to membership. Mutual engagement entails regular interactions among members engaging in joint activities, sharing information, discussing problems and helping each other. Learning from each other and advancing knowledge is key to the community activities. Engagement results in established norms and

relationships. As a result of engagement and interactions, CoPs develop shared repertoire over time. This includes communal resources such as language, routine, artefacts, tools, stories and styles particular to the community. The underlying assumption of Wenger is that CoPs involve a process of collective learning entailing sustained mutual engagement around a shared domain resulting in shared and potentially improved practice and outcomes.

Three outcomes of social learning processes can be identified, based on the definition of social learning by (Reed *et al.*, 2010):

- Learning occurs through social interaction (relational outcome);
- Learning is situated within wider social units or CoPs (shared understanding); and
- Learning implies a change in understanding in the individuals involved, which may lead to improved outcomes (substantive outcome).

The early conceptualisation of CoPs saw them as spontaneous and self-organised structures (Wenger, 1999), which emerged through organic interactions. However increasingly it has been recognised that these communities can be managed with resources given for their development (Wenger, McDermott, & Snyder, 2002) (It could be argued that the spontaneous, self-organised structures were largely bottom up in nature, compared with the more formalised, top-down structures which tend to have pre-defined, desired outcomes). A key consequence of the concept that they can be managed is how to evaluate them (Wenger *et al.*, 2002). There are key benefits of evaluating CoPs as highlighted by Braithwaite and colleagues:

“Without an evaluation framework, model and tools, sponsors will continue to be uninformed as to what communities of practice and social networks deliver; will be unable to identify and measure their strengths and weaknesses; and will be frustrated in their efforts to achieve desirable outcomes, and returns on investment. This has profound implications for how communities of practice and social-professional networks are enabled, configured and resourced. Such research is at the heart of a crucial question: how well do groups of professionals work together and how could they be organised to work together more effectively?” (Braithwaite *et al.*, 2009, p. 3)

Evaluation of communities of practice

The focus of this rapid review is on evaluations of Communities of Practice. A total of twelve communities of practice evaluations were reviewed for the purposes of this literature review. Further potential evaluations were identified but the reports were not available or hyperlinks to the reports were broken. This initial literature search suggests that many communities of practice do not produce evaluation reports, or if they do they are not published on publicly available platforms, however there may be more that are available which we could not access due to the compressed time periods within which this review was written or lack of accessibility of the publications (this highlights the importance in the case of the Healthy Ageing Challenge Community of Practice evaluation to disseminate findings on a publicly available platform and in open access journals to aid the dissemination of learning around evaluating communities of practice). Of the twelve reviewed, two were only PowerPoint presentations, however they were still included within the analysis offered here as they highlight the methodologies, methods and key strengths and limitations of the approaches used (see appendix 3 for summary of methods employed by the evaluations reviewed).

The evaluations of CoPs were of varying depth and quality, although this should not be seen as an indication of the skills of any evaluator, but rather the availability of resources, the purpose of the evaluation and (as we argue below) the maturity of evaluation techniques for assessing Communities of Practice. Of the twelve evaluations, seven had articulated underlying methodologies for completing the evaluation, of which Wenger *et al.* (2011) was the most popular. Other theoretical assumptions such as Action Learning (Pedler, 2008; Revans, 1982) were also used. The two evaluations that we judged to be the most sophisticated grounded their evaluation in the CoP literature, with a more developed understanding of the key texts.

The objectives for the evaluations varied considerably. Some were process evaluations, seeking to capture the experiences of CoP members or examining how the CoP worked. These often, although not explicitly, took a strengths based approach (van Winkelen, 2016), sometimes explicitly seeking to demonstrate the value of the CoP with little focus on the costs or weaknesses. Other evaluations took a more content and outcomes-based perspective, focussing on the actual learning which came out of the CoP. In this sense these evaluations were not about the CoP *per se* but rather the outcomes that the CoP produced.

The evaluations used a variety of methods and were uneven in quality (again this should not be seen as an indictment on the evaluator themselves rather the resources available). Quantitative approaches such as surveys after each session, or summative surveys at the end of the evaluation period were used. A couple used bench-marked data to capture before and after the evaluation. Qualitative approaches included telephone and face-to-face interviews, focus groups and interviews with key stakeholders or expert interviews. Observations were used in some evaluations and some used guided reflections. Some of the evaluations, particularly those using Wenger *et al.* (2011) and Kirkpatrick and Kirkpatrick (2006) as underlying models for understanding the CoP, were able to construct measures that could begin to capture some of the key indicators that they were exploring in the CoP. It is notable that none of the evaluations presented here used validated measures for exploring CoPs or offered analysis comparing the findings within that CoP against other CoPs. This, as we will indicate below, is not because of a weakness within any one particular evaluation, but that to date, at least as identified in the literature explored for this review, validated measures of CoPs do not yet exist (which is perhaps to do with the nature of CoPs and the emerging nature of the field and the associated evidence base).

The strongest evaluations demonstrated an awareness of the limitations of their approach and provided more analytical consideration of both the possibilities and challenges of conducting an evaluation. These evaluations were also the ones that presented the more sophisticated account of what a CoP is and how it might be assessed. They presented analysis that chimes with the academic analysis of evaluating communities of practice, that there are significant areas to develop in terms of the evaluation tools. It is to this issue that we now turn.

The challenges of evaluating communities of practice

Our analysis of the publicly available evaluations of Communities of Practice indicate that there are few agreed methods, approaches or validated measures for conducting an evaluation of a CoP. Indeed, as one of the most developed evaluations in our sample states: “to date the evaluation frameworks used have been insufficiently detailed and targeted to get to grips with the complex ways in which CoPs vary, interact with their environment and reinforce or undercut other initiatives which coincide in place and time” (Garrod & Ling, 2018, p. 7) (this rapid review assumes that by ‘undercut’ the authors are referring to other forms of learning, support, management and

engagement that often occur within largescale initiatives, such as engagement with funders or action learning processes).

There have also been a number of systematic reviews of evaluations within Communities of Practice and Virtual Communities of Practice that this analysis draws on (see Alcalde-Rabanal, Becerril-Montekio, & Langlois, 2018; Barbour, Armstrong, Condrón, & Palermo, 2018; da Silva, de Souza Gimenes, & Maldonado, 2020; Fulgenzi *et al.*, 2020; Goepp, Matta, Caillaud, & Feugeas, 2019; Linda C Li *et al.*, 2009; L. C. Li *et al.*, 2009; McKellar, 2019; McKellar *et al.*, 2014; Ranmuthugala *et al.*, 2011; Rienties *et al.*, 2016; van Winkelen, 2016 for examples). Overall, they highlight that whilst there is considerable interest in CoPs and the possibilities of evaluating them, evaluations of CoPs are not particularly developed.

One of the most comprehensive systematic reviews is offered by McKellar, Pitzul, Yi and Cole (2014) (see also McKellar's doctoral thesis (2019)). McKellar and her colleagues state that:

“despite the growing interest in, and implementation of, CoPs, little agreement exists on approaches to evaluate their influence (Li *et al.* 2009b) and limited evaluation of CoPs and knowledge networks has occurred (Li *et al.* 2009b; Bertone *et al.* 2013). As a result, empirical evidence supporting the effectiveness of CoPs remains limited, and even fewer analyses investigate the mechanisms that determine effectiveness (Li *et al.* 2009b)” (McKellar *et al.*, 2014, p. 384).

This was not the first time that the claims regarding the limitations of evaluations of CoPs are made in the literature. Braithwaite and colleagues' earlier review stated that: “Many authoritative commentators agree that analytic evaluation methods and tools are lacking” (Braithwaite *et al.*, 2009, p. 3), and this has been echoed in a recent study by Fulgenzi and colleagues who state: “there is insufficient focus and a lack of consensus on how to evaluate their outputs” (2020, p. 6). This is also seen as the case for Virtual Communities of Practice (VCoP) where Hafeez and colleagues state there is an absence of measures to evaluate knowledge sharing in VCoP's (Hafeez, Alghatas, Foroudi, Nguyen, & Gupta, 2019). The problems with evaluations of CoP's are summarised by Fulgenzi *et al* who state:

“Two other major limitations of current qualitative and quantitative approaches consist in (a) a lack of consensus on the hypothesis, indicators, and preconditions that are believed to support the development of CoPs (e.g., Craps & Maurel, 2003; Wenger *et al.*, 2011); and (b) a poor understanding of the causal relationships between co-production processes occurring within CoPs and their outcomes (Cox, 2005; Wenger *et al.*, 2011). These limitations hamper a clear understanding of the preconditions and processes that make a CoP “effective” in stimulating and supporting social learning. In addition, the complicated and resource-intensive nature of the evaluation frameworks result in a low transferability beyond the knowledge-management sector” (Fulgenzi *et al.*, 2020, p. 6).

Therefore, despite the high level of interest in Communities of Practice's capacity for knowledge sharing, approaches to evaluation are under-developed. This is partly due to the field still developing, and also the inherent nature of what COPs are about. As stated earlier in this rapid review, one of the central aspects of CoPs is that they stress the emergent, fluid and complex (and

often informal) nature of the learning. This presents inherent issues for evaluation as is neatly summarised by van Winkelen:

“Although there is widespread acceptance that CoPs are useful, formally assessing their value and understanding what helps them to be more effective is less easy: they are complex social systems, and it is inherently difficult to directly connect cause and effect” (van Winkelen, 2016, p. 142).

The literature highlights a number of key challenges with conducting evaluations of Communities of Practice. These are the main ones:

Immature evaluation methodologies: Evaluation of CoPs is at an early stage of development with few agreed methodologies (Braithwaite *et al.*, 2009; Fulgenzi *et al.*, 2020; McKellar, 2019; McKellar *et al.*, 2014). Therefore, to date there are few standard approaches, that have been agreed within the evaluation community for conducting a Community of Practice evaluation, including no validated measures for quantitative analysis. The academic (Braithwaite *et al.*, 2009; Fulgenzi *et al.*, 2020; McKellar *et al.*, 2014) and grey literature (i.e. Garrod & Ling, 2018) all recognise that this is a developing field and there is considerable room for development of methodologies and methods for evaluating CoPs.

Variety of evaluation goals: Literature highlights the wide variety of different aims that evaluations of CoPs seek to evaluate, from learning and participation to cost effectiveness. This occurs because CoPs have a wide variety of different goals. On one hand this is a strength of CoPs as they can respond to a variety of needs and each one is different, but this lack of standardisation presents challenges as there is little consistency across evaluations, with little opportunity for replicability.

Variety of context: Alongside the variety of goals there is also a variety of context, in terms of size, shape, membership and maturity of CoPs resulting in different formats and possibilities for evaluation (LaRocca, Yost, Dobbins, Ciliska, & Butt, 2012). Again, this diversity is a strength of CoPs as they can be used in many difficult contexts. However, it also offers challenges for evaluation as there are no standard approaches as each reflects the context in which they work. As a consequence Barbour and colleagues state: “[Evaluation approaches appeared to be tailored to the type of CoPs](#)” (2018, p. 340), again reducing the consistency of evaluation approaches.

Resource intensive: The level of resources presents a significant challenge for conducting evaluations, particularly as many of the approaches require long, in-depth interviews and observations which can be time-consuming. In particular, some evaluation techniques take a more grounded theory approach, using unstructured interviews, which can produce more redundant data and are more difficult to analyse, therefore taking more time and resources.

Evaluation vs functioning of the community: Related to the issue of resource intensity is the challenge that evaluation can be time consuming for the participants themselves, and sometimes participants can feel overly burdened with evaluation or spending too long simply justifying the existence of the Community of Practice.

Difficulty of identifying causal links: It is difficult to make causal links which are normally important in evaluations (Ranmuthugala *et al.*, 2011). The organic and fluid nature of CoPs, and the understanding that that learning is a social process, which are one of the strengths of CoPs, are a significant challenge when it comes to evaluating CoPs as there are multiple factors occurring simultaneously and therefore it is difficult to identify causal links.

Intangible outcomes: One of the strengths of CoPs can be that they produce many intangible outcomes, like mutual trust, inspiration or commitment, but [these intangible outcomes can be more](#)

difficult to assess.

Reliance on self-reporting: One of the key challenges that comes with CoPs is that the success of the CoP and the impact it has are largely a matter of perception. As Barbour and colleagues state there is: “[limited scope in the evaluation methods used and a lack of rigour because of reliance on participants self-reporting perceptions of impact or outcomes](#)” (Barbour *et al.*, 2018, p. 341).

Justification of CoPs: Some of an evaluations’ central objective were to justify the existence of the CoP itself. This often meant they took a strengths based approach, but van Winkelen (2016) suggests that it can be difficult for respondents to switch between the two: “[the fine balance between focusing on strengths and asking the hard improvement questions that developmental evaluation requires, observing that “one interviewee found it a challenge to switch from talking about what is working well to areas of improvement”](#) (van Winkelen, 2016, p. 149).

Challenges of evaluating virtual CoPs: VCoPs present particular challenges as some of the processes of interaction and learning occur in a virtual space, which presents new challenges (da Silva *et al.*, 2020). In particular as this approach is new, “[there are few clear criteria for judging the effectiveness of communities of practice, the evaluation framework used here was successful in identifying the state of progress](#)” (Urquhart, Brice, Cooper, Spink, & Thomas, 2010, p. 49) (for a more recent discussion see Hafeez *et al.* (2019), El Morr and Eftychiou (2017) and Donaldson (2020) who recounts a VCoP within the COVID-19 pandemic).

Therefore, evaluation of Communities of Practice present considerable challenges. Similarly, as touched on earlier, Kerno (2008, p. 71) highlights Communities of practice themselves have a number of key structural components that demonstrate the variety of types of CoPs (and therefore, by extension, the challenges of creating consistent evaluation methods):

- *Population size:* can vary from a few members to hundreds. As the community grows in size, CoPs are likely to divide into sub-groups either based on geography or on subtopic to optimise membership activity and experience.
- *Longevity:* development of practice may vary from few years to several centuries (although this is rare and more associated with organic, informal or self-organised CoPs).
- *Means of member interaction:* although communities generally develop as people are co-located and regularly interact together, new means of communication allow for development of geographically dispersed and virtual CoPs.
- *Product vs. process:* CoPs may bring together individuals with similar knowledge and background based on the same functional responsibilities (e.g. engineering, marketing, human resources); CoPs may also be formed along product lines and projects where people with different functional responsibilities share a common product/project responsibility.
- *Intra- vs. inter-organizational:* CoPs may be developed within an organisation, at business unit level or spanning across departments and divisions. CoPs may also extend the boundaries of the organisation, particularly in fluid and rapidly changing industries where peers share knowledge and resources (there can be an overlap or similarity with Action Learning, which often involves people from different organisations around a shared theme of interest).

Therefore, evaluation of communities of practice face a number of key challenges. Some structural – built into the fabric and concept of Communities of Practice themselves and the challenges of capturing learning - some are to do with the variety of types of Communities of Practice and the difficulties of gaining consistency across them, and finally the other key challenges surround the evolution of Communities of Practice evaluation techniques and the need for more research (Garrod & Ling, 2018). As Barbour *et al* conclude:

“There is a need for further research to develop and test a multifaceted evaluation method that considers multiple dimensions of impact using qualitative and quantitative methods, including cost benefit and effectiveness impacts” (2018, p. 341)

Possibilities for evaluation

So far in this review we have highlighted the challenges associated with developing evaluations of Communities of Practice. CoPs are complex social systems, that vary considerably in terms of size, scope, maturity and purpose. They are therefore difficult to evaluate, as van Winkelen notes:

“CoPs can operate on multiple scales in an organization, and so there are multiple levels of impact, namely, individual member, network level and organizational level; multiple timelines are involved – some short-term and some longer-term. This suggests that approaches to evaluation suited to a complex social context need to be considered in relation to CoPs” (2016, p. 143)

However, despite the significant challenges that occur within evaluations of CoPs, there is a plethora of different approaches, methods, and suggestions to design principles for developing an evaluation of a CoP. The following account cannot be considered a full digest into the core principles of developing an evaluation into a CoP as this falls outside the scope and the time available to develop this review, rather it presents a sketch of some of the key areas that can be considered when developing an evaluation of a Community of Practice.

Theoretical framework and Theory of Change

The more developed evaluations examined for this review outlined the key principles and assumptions around how Communities of Practice operate and how this would work in their particular context. Understanding these mechanisms that shape how CoPs succeed (and fail, see Probst and Borzillo (2008) for a discussion) are important in developing an understanding for the framework for evaluation. Some of the evaluations developed this into a Theory of Change to understand how the CoP was operating.

The academic and practitioner literature offers a number of starting points to explore the key principles behind what makes a CoP work (Wenger, 1999; Wenger *et al.*, 2002), including Probst and Borzillo (2008) Ten Commandments, and Donaldson (2020) design principles for Virtual Communities of Practice (see appendix 1 for more details).

Similarly, as indicated above, the context within which the CoP takes place is important. Therefore some of the more developed evaluations within the review also provided a literature review for how learning takes place within the context, to shape the Theory of Change. Ranmuthugala *et al.* (2011) who contrast traditional evaluation against what they call realist evaluation. A traditional has pre-defined outcomes to be measured, whereas a realist evaluation focuses on how and why things occurred, and is more descriptive and emergent. They state a “realist evaluation is a theory-driven approach to understanding what it is about a program that achieves a particular outcome in one setting and a different outcome in another” (Ranmuthugala *et al.*, 2011, p. 2). Ranmuthugala *et al* provide 4 stages to do this:

1. *Theory*: systematic review, stakeholder interviews and theory building;
2. *Hypothesis generation*: developing hypothesis to be tested;
3. *Observation*: conducting surveys, core interactions, social network analysis etc;
4. *Program specification*: understanding explanatory factors.

Value Creation Networks

A number of models of how communities of practice occur have been developed that provide opportunities to evaluate the CoP. The most developed methodology is provided by Wenger, Trayner and de Laat (2011) who have developed an evaluation framework built on Donald Kirkpatrick's four-level model (Kirkpatrick & Kirkpatrick, 2006). They seek to explore "the value of the learning enabled by community involvement and networking" (Wenger *et al.*, 2011, p. 9). Their model has 5 cycles:

- *Cycle 1. Immediate value*: the activities and interactions between members have value in and of themselves.
- *Cycle 2. Potential value*: the activities and interactions of cycle 1 may not be realized immediately, but rather be saved up as knowledge capital whose value is in its potential to be realized later.
- *Cycle 3. Applied value*: knowledge capital may or may not be put into use. Leveraging capital requires adapting and applying it to a specific situation.
- *Cycle 4. Realized value*: even applied new practices or tools are not enough. A change in practice does not necessarily lead to improved performance, so it is important to find out what effects the application of knowledge capital is having on the achievement of what matters to stakeholders.
- *Cycle 5. Reframing value*: this happens when learning causes a reconsideration of how success is defined. It includes reframing strategies, goals and values.

As they state in a later paper: "In this framework, social learning is theorized as loops that carry value creation across cycles and back" (Wenger-Trayner *et al.*, 2019, p. 324).

They argue evaluators need "two types of data: (a) *effect data* about changes that matter and (b) *contribution data* about the plausible role of the intervention" (Wenger-Trayner *et al.*, 2019, p. 324 italics in original). Effect data is needed for each stage of the cycle, and can be quantitative or qualitative. Contribution data is more difficult to capture as social interventions are difficult to control – they therefore propose value creation stories (Wenger-Trayner *et al.*, 2019; Wenger *et al.*, 2011) which capture the value that the CoP has created. These value creation stories "provide tight accounts of the flow of value across cycles" (2019, p. 327). They require the following elements (2019, p. 327):

- *A clear protagonist*: Telling the story in the first person supports identification with the story teller as legitimate carrier of value across the framework.
- *A specific case*: It addresses specific events, contributions, and changes as inspectable data points rather than generalities.
- *Completeness*: It traverses at least the first four cycles and thus avoids skipping steps in the explanation.
- *Plausibility*: It details the causal links between adjacent cycles so that the flow of value becomes visible.

These value creation stories are rare, need to be guided and often revisited (Wenger-Trayner *et al.*, 2019). They argue that this approach should be combined with other methods to provide a rich picture.

This approach also offers an emergent interpretation of the evaluation process. They state “Value-creation stories are generated from two sources: from participants who have an experience of value creation and from salient indicators that need to be contextualized in relation to the intervention” (2019, p. 330). Thus, the indicators will shape the stories, but the stories will alert the evaluator to what indicators to explore.

Methods

Barbour *et al.*'s (2018) systematic review of evaluations of CoPs highlighted the following methods that have been used in the evaluations that they have assessed. These include:

- Focus groups.
- Most significant change technique.
- Structured telephone interviews about perceptions of purpose, expectations, outcomes, success factors and limitations.
- Self-administered survey – frequency of participation, roles played, types of interaction and perceived benefits.
- Baseline data and follow-up in-person survey.
- Telephone interviews on how CoPs influence knowledge, attitudes, skills, practices, positions taken, networks and systems change.

They found large varieties in the approaches that different evaluations use. There is little consistency or standard approaches, ranging from qualitative to quantitative, outcome to process focused (Barbour *et al.*, 2018). More recently da Silva and colleagues proposed Social network data analysis can be used, particularly in VCoPs as a way of understanding the interactions that are occurring (da Silva *et al.*, 2020).

A number of theorists have put forward some possibilities for assessment. One useful summary is provided by Fulgenzi *et al.* (2020):

Table 1: Overview of existing CoP evaluation frameworks and methods

Predominant approach	Author(s) and scope of the study	Data-gathering method	Strengths of the method	Weaknesses of the method
Qualitative	Wenger et al. 2011: Conceptual framework to assess “value creation cycles” (maturity model).	Creation of “value creation stories” demonstrating value of CoP outcomes (anecdotal evidence).	Systematic collection and construction of stories; Division in value creation cycles (maturity stages).	Retrospective study on the added-value of CoP outcomes; Resource-intensive evaluation method.
	Probst & Borzillo, 2008: Assessment of CoP leaders’ perception of “governance” mechanisms determining the success of failure of CoPs in intra-organisational networks.	Likert-type questionnaire, focus group, and semi-structured interviews.	General governance mechanisms (transferability potential); Identification of best practices.	CoPs used as knowledge management tool in business setting; Focus on management theory and organisational performance.
	Thompson, 2005: Evaluation of the relationship between a CoP and the parent company establishing it.	Non-participant observation and unstructured interviews.	In-depth analysis of the relation between the structural and epistemic components; Ethnographic observation allows for identification and causality between activities and outcomes of a CoP.	CoPs used as knowledge management tool in a business setting; Retrospective and resource-intensive evaluation method.
Quantitative	Lee, Suh, & Hong, 2010: Prescriptive assessment of CoP evolution stages based on critical success factors (maturity model).	Likert-type questionnaire.	Maturity stages built upon literature review; Relative weight assigned to critical success factors.	Prescriptive, based on fixed maturity stages and success factors.
	Boughzala & Bououd, 2011: Prescriptive assessment of the capability of CoP to manage knowledge (maturity model).	Likert-type questionnaire.	Systematic framework building upon review of existing maturity models; Transferability of potential.	Prescriptive, relevance of criteria based on evaluator’s perception; Evaluation focussed on ICT tools (online for a and communities).

Source: (Fulgenzi *et al.*, 2020, p. 7).

Other reviews highlight the possibilities of ethnography, computer modelling and statistical methods (Lorenz & Barlatier, 2007).

Assessment and indicators

One key approach to evaluation can be around a number of indicators of the functioning of the Community of Practice. Thompson (2005) outlines 14 key indicators, drawn from Wenger's early work on Communities of Practice:

1. Sustained mutual relationships-harmonious or conflictual.
2. Shared ways of engaging in doing things together.
3. The rapid flow of information and propagation of innovation.
4. Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process.
5. Very quick setup of a problem to be discussed.
6. Substantial overlap in participants' description of who belongs.
7. Knowing what others know, what they can do, and how they can contribute to an enterprise.
8. Mutually defining identities.
9. The ability to assess the appropriateness of actions and products.
10. Specific tools, representations, and other artifacts.
11. Local lore, shared stories, inside jokes, knowing laughter.
12. Jargon and shortcuts to communication as well as the ease of producing new ones.
13. Certain styles recognized as displaying membership.
14. Shared discourse reflecting a certain perspective on the world.

(Indicators that a CoP Has Formed based on Wenger, cited in Thompson, 2005, p. 153).

More recently Fulgenzi *et al.* (2020, p. 8) have identified 6 key success factors: "(a) organizational support, (b) atmosphere of the meeting, (c) representation and engagement, (d) convergence on a shared perspective, (e) identification of opportunities and challenges, and (f) generation of knowledge" each with a series of underpinning indicators. Such indicators present the possibilities of assessment.

Furthermore the CoP literature indicates some further possibilities for assessing the effectiveness of the CoP, such as models of maturity (J. Lee, Suh, & Hong, 2010) or how quickly members can become involved in the community.

Concluding points

This review offers a rapid assessment of some of the literature around evaluations of Communities of Practice. It is worth repeating the caveat that this review was time-limited and only a range of academic and grey literature was consulted, therefore the material presented here should be noted as a considered introduction to the subject and highlighting of key concepts and approaches to inform and inspire evaluation of CoPs. It has drawn on a number of relevant, related systematic reviews, who come to a similar conclusion that whilst there is a considerable need for evaluations of Communities of Practice, the field currently lacks consensus on the right approaches to conducting an evaluation, and the causal relationships involved in a CoP are not fully understood (Alcalde-Rabanal *et al.*, 2018; Barbour *et al.*, 2018; Braithwaite *et al.*, 2009; Fulgenzi *et al.*, 2020; McKellar, 2019; McKellar *et al.*, 2014; van Winkelen, 2016). This is in part because the evaluation mechanisms are still very much developing, and there is a need for more research (Garrod & Ling, 2018), but also the diversity of size, context, purpose and maturity of the CoPs themselves. Indeed, that the approaches to evaluation are not settled should not necessarily be seen as a problem, rather that it could be seen more an art rather than a science, with many methodological, epistemological and philosophical choices involved in the design and framing of the evaluation. Each Community of Practice will have its own approach to learning (which will indeed evolve over

time), understanding of what constitutes success and priorities that should be reflected in the evaluation.

The emerging evaluation literature does however provide a range of resources for an evaluation to be built around, most notably the work of Wenger (Wenger-Trayner *et al.*, 2019; Wenger *et al.*, 2011) but also some of the new and emerging approaches outlined in this review. Some of the stronger evaluations included within this study and in the academic literature make available interview schedules and survey designs, which although do not reach the threshold of validated measures, do provide possibilities for consideration and potential adaption (and the specific evaluations and resources considered in this rapid review are available on request to interested parties). The extent to which it would be feasible, and indeed desirable for more consistency across evaluations is contested, as whilst they would offer advantages the need to be responsive and adaptable to local circumstance is important.

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Appendix 1: Summary of academic and grey literature reviewed

1. Key principles and conceptualisation of community of practice

Communities of practice (CoP) are formal or informal groups of people sharing a common interest usually around a craft or profession. CoPs may form naturally as practitioners interact together or may be formed deliberately. The aim of CoPs are to share learning, exchange and advance knowledge, support peers within the group. The following section reviews the main conceptualisations of CoPs, considering the core principles that make a CoP successful and the principles leading to change.

Lave, J. and Wenger, E. 1991. *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

The concept of Communities of Practice (CoP) originated in the work of Lave and Wenger (1991) on situated learning. This work introduced a new paradigm on learning, particularly learning taking place in the workplace. In contrast to a cognitive view of learning as individual phenomenon, Lave and Wenger postulate that learning is the result of social interactions and engagement in practice. Legitimate peripheral participation enables access to the community and is fundamental for developing knowledge, skills and identity.

Lave and Wenger (1991, p. 98) define a community of practice as ‘a system of relationships between people, activities, and the world; developing with time, and in relation to other tangential and overlapping communities of practice’. Community implies ‘participation in an activity system about which participants share understandings concerning what they are doing and what that means for their lives and for their communities’ (1991, p. 98). The underlying assumption in Lave and Wenger’s work is that CoP are rather static and homogeneous, limiting power dynamics to potential conflicts between newcomers and old-timers. Situated learning presents an overview of how newcomers are socialised in the CoP and how knowledge sharing is instrumental for the reproduction of the community. CoP are thus viewed as embodiments of knowledge.

Wenger, E. 1998. *Communities of practice: learning, meaning and identity*. Cambridge: Cambridge University Press.

Wenger (1998) further developed the definition of CoP as a social group cohering through *mutual engagement* on a *joint enterprise* and creating a shared *repertoire* of communal resources. This conceptualisation views CoP as groups of people sharing a common interest and collectively contributing to the practice of the community. The joint enterprise – or domain of interest- shapes the identity of the community and brings people together around a knowledge or activity. Being a member of a community is thus defined by the domain, and competence around the domain is key to membership. Mutual engagement entails regular interactions among members engaging in joint activities, sharing information, discussing problems and helping each other. Learning from each other and advancing knowledge is key to the community activities. Engagement results in established norms and relationships. As a result of engagement and interactions, CoP develop shared repertoire over time. This includes communal resources such as language, routine, artefacts, tools, stories and styles particular to the community. The underlying assumption of Wenger is that CoP involve a process of collective learning entailing sustained mutual engagement around a shared domain resulting in shared practice.

Kerno, S.J., 2008. Limitations of communities of practice: a consideration of unresolved issues and difficulties in the approach. *Journal of Leadership & Organizational Studies*, 15(1), pp.69-78.

Drawing from Wenger (1998), Nickols (2007) and Roberts (2006), Kerno (2008, p. 71) compiles the common characteristics of CoP as follows:

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- Continuity of mutual relationships; may be harmonious or conflicting. Including task- or work-related relationships; may be collegial or strained.
 - Shared ways of engaging in common activities, best practices.^{[L]_{SEP}}
 - Rapid flow of information among community members (very fluid grapevine).^{[L]_{SEP}}
 - Absence of introductory preambles or ceremonial speech (no “come to order” pronouncement). Conversations and other interactions often have the character and feel as if they are simply being continued from where they stopped.
 - Problems and other issues quickly framed; little necessity of providing extensive background.
 - Common consensus regarding membership, belonging.^{[L]_{SEP}}
 - Awareness of others’ competencies, strengths, weaknesses, where contributions can be maximized.
 - The ability to assess effectiveness and appropriateness of actions taken and products produced.
 - Common tools (physical and cognitive), methodologies, techniques, and artifacts.
 - Common stories, legends, lore, inside jokes, humor, etc.^{[L]_{SEP}}
 - A shared and evolving language, including jargon, acronyms, and unique terminology. Nature of the group also facilitates the creation of language “shortcuts” to increase communication efficiency.^{[L]_{SEP}}
 - Behavioral patterns and interactions recognized as signifying membership.
 - Common perception, viewpoint, or vantage point of relevant external environment.
-

Wenger, E. 2000. Communities of practice as social learning systems. *Organisation*, 7 (2), 225-246.

According to Wenger (2002), when designing itself, a CoP should consider particular elements underlying its sustainable success:

- **Events:** events are important in bringing the community together and develop its identity. Event types and frequency depends on the community shared domain. These may range from formal and informal meetings; problem-solving sessions and guest speakers.
- **Leadership:** CoP require multiple forms of internal leadership, ranging from a community coordinator, networkers, administrators documenting the practices, pioneers. These roles may be conducted by few key individuals or may be distributed widely, and may vary over time.
- **Connectivity:** brokering relationships between people is vital for fostering everyone’s engagement in the community. Multiple media and channels may be adopted.
- **Membership:** membership should be focused on the community identity – the joint enterprise. Whenever the community membership is overextended, the community may split in subgroups.
- **Learning projects:** CoP should take responsibility for their learning. A learning agenda may further advance the community practice.
- **Artefacts:** documents, tools, stories, symbols, website, need to be managed and updated.

Wenger, E and Snyder, W.M., 2000. Communities of practice: The organizational frontier. *Harvard business review*, 78(1), pp.139-146.

Wenger, E., McDermott, R.A. and Snyder, W., 2002. *Cultivating communities of practice: A guide to managing knowledge*. Harvard Business Press.

Wenger, E. (2004). Knowledge management as a doughnut: Shaping your knowledge strategy through communities of practice. *Ivey Business Journal*, 68(3), 1-8. ^[L]_{SEP}

Whilst the above conceptualisations of CoP present them as spontaneous and self-organising entities, later work has shifted the focus on how organisations may intentionally establish, manage and support CoP for strategic advantage.

Further work by Wenger, McDermott and Snyder (2002) considers CoP as management tool. CoP are here defined as “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” (p. 4). This definition focuses the purpose of CoP on a shared topic and presents CoP as social units engaged in learning and knowledge development. The authors concede that CoP as management tool are critical for strategically managing knowledge within organisations.

Viewing CoP as management tools poses however the challenge of developing and integrating fundamentally informal and self-organising communities within structured organisations. In this respect, Wenger and Snyder (2000) advance the following recommendations: 1) identify potential CoP that will enhance the organisation’s strategic capabilities; b) provide the infrastructure that will support such CoP and enable them to apply their expertise effectively; c) use non-traditional methods to assess the value of the organisations’ CoP. ^[L]_{SEP} Concerning the first point, informal networks of people with common interests and expertise may already exist within the organisation. Secondly, organisations need to support CoP providing resources, coordinating activities and establishing structures which foster collaboration. Thirdly, evaluating CoP is challenging given that positive results manifest themselves over time and often in the work of teams and business units, rather than in the CoP itself. Accordingly, evaluation should be based on a systematic collection of stories and anecdotes demonstrating how participation in CoP resulted in improved effectiveness at business level.

Further, Wenger (2004) introduced the “doughnut” model (Fig. 1) as framework for explaining how CoP may function as knowledge management tools in organisations.

Figure 1. The doughnut model of knowledge management



Starting from the organisation strategy, a set of domains are identified. The organisation should consider what knowledge it requires to be in business and to compete effectively. The identified domains are arenas of knowledge bringing people together. The community is then organised around each domain bringing together people with knowledge and expertise around the domain. This process may take several forms, ranging from reputable practitioners leading the group, sending out invitations, conducting interviews with potential members to social network analysis. Once the community is established, the practice is the developing and evolving body of knowledge shared among its members. Consequently, the application of knowledge and best practice developed within the community on the job – either individually or collectively – results in performance improvements. When the informal nature of CoP is sponsored, supported and legitimised, the body of knowledge and practice developed within the community can transfer to the formal structure of the organisation, improving performance. This transfer of knowledge is facilitated by the fact that individuals are simultaneously members of CoP and of work-related teams or groups, acting as direct “carriers” of knowledge.

Further, the learning and best practice developed within communities and applied on-the-job need to be systematically captured, integrated and distributed. As illustrated in Fig. 1 learning, sharing and stewarding are the mechanisms for translating performance into strategy. The knowledge developed within the CoP is thus codified and disseminated broadly to become permanent within the organisation. Stewarding takes two separate but related forms: on one hand the strategic value

of the knowledge developed within the CoP is recognised and active planning is set up to systematically advance the community's knowledge in line with the organisation strategic direction. On the other hand, CoP may recognise the value of this knowledge and create new business opportunities advancing the competitive position of the organisation and improving its strategy.

Probst, G. and Borzillo, S., 2008. Why communities of practice succeed and why they fail. *European Management Journal*, 26(5), pp.335-347.

Building on this line of work, Probst and Borzillo (2008) conducted an empirical study to explore the specific governance mechanisms through which CoPs are successfully guided. Data collected from interviews with 57 CoP leaders from organisations such as Siemens, Oracle, IBM, Daimler, Holcim, Mitsubishi, Mazda, Pioneer, Bearing Point, the World Bank, the World Health Organization, the United Nations, and CERN, led to the identification of ten governance mechanisms at the basis of successful development and sharing of best practices.

Table 1 summarises the “Ten Commandments of CoP governance”.

Commandment	Explanation	Example
1. Stick to strategic objectives.	Setting clear and measurable objectives provides CoP members with clear direction when developing and sharing best practice	% of cost reduction, % of revenue increase, % of time reduction, increase in customer satisfaction.
2. Divide objectives into sub-topics.	A taxonomy of objectives organised into topics provides clarity around different areas on which practice should be developed.	An “engine high performance” CoP may be divided into sub-topics based on different parts of the engine (internal combustion, valves, cooling systems, etc.)
3. Form governance committees with sponsors and CoP leaders.	Governance committees should oversee CoP which are active in the same functional area and regularly meet to oversee the activities of each CoP. This may result in sharing of best practices across the CoPs, merging of CoPs when considerable areas of overlap are identified.	At Siemens the “Process Council” unites sponsors and leaders of three different CoPs, respectively focused on supply chain management, product lifecycle management, and support management.
4. Have a sponsor and a CoP leader who are “best practice control agents”	The sponsor and the CoP leader shall control whether the CoP develops and shares best practices over a predetermined period of time. They may also assign a set number of practices to be developed.	☐ Generally the sponsor assesses best practices on the basis of: - punctuality (does it allow time saving?) ☐ - quality (does it deliver better output or lead to higher revenues?) ☐ - cost (does it enable the organization to save costs?).
5. Regularly feed the CoP with external expertise.	Experts from outside or inside the organisation shall give regular presentations on specific topics related to the practice; this results in improved motivation and fosters creativity and innovation within the CoP.	A CoP of cardiologist and hearth surgeons regularly invites specialist doing presentations on a particular part of the human hearth.
6. Promote access to other intra and inter-organisational networks.	Interacting with other CoP members allows access to practice-related experts beyond the CoP boundaries. This enables external benchmarking	IBM engineers and software programmes belonging to the “electronics” CoP are encouraged to interact with experts in electronics

	leading to improved internal practices.	situated in other communities within IBM (internal benchmarking) or outside (external benchmarking).
7. The CoP leader must have a driver and promoter role.	Leaders should structure the CoP in sub-topics and coordinate the CoP as whole. Sub-topics become clusters of particular CoP knowledge areas.	In a global organisation a CoP spanning globally has instituted 10 country coordinators responsible of bringing together members in various countries. Sub-CoP focused on narrow topics have been established, each with a sub-CoP expert supervisor in charge of assisting with members requests. Communication is facilitated and members motivation to participate is stimulated.
8. Overcome hierarchy-related pressures.	CoP are hierarchy-free learning zones where members are not under their supervisor's scrutiny. A zero-sanction and risk-free atmosphere can foster members full participation, particularly when admitting knowledge gaps or making mistakes.	In this environment, members do not fear losing their job or being demoted if admitting knowledge gaps; open criticism of existing practices is encouraged and positive suggestions for improvement are fostered.
9. Provide the sponsor with measurable performance.	The CoP objectives are measured (i.e. in terms of cost reduction, revenue increase, speed of operations) and the sponsor can report such figures to management and ensure the CoP maintains funding and support.	Measuring how many days are saved in delivering a solution to a client when a CoP solution is implemented. Having proved its strategic relevance, the CoP receives further management support in terms of funding and resources.
10. Illustrate results for CoP members.	Members are encouraged to post "stories" illustrating experiences with a best practice. In so doing, other members can see the benefits of participating in the community and are motivated to be involved. The sponsor is provided with evidence to feed back to management to prove the strategic benefits of the CoP.	Members tell a story explaining the whole process about implementing the practice in their unit, using it and improving it. They also illustrate how they measure results and benefits generated.

In addition to the Ten Commandments, Probst and Borzillo (2008) identify five reasons explaining why CoP members fail to develop and share best practices. These are summarised in Table 2.

Reason for failure	Explanation
1. Lack of core group	A group of core members actively engaged in the communities' activities (meetings, problem-solving, sharing of ideas), usually emerging at the stages of development of the community and should remain in place over time.
2. Low level of one-to-one interaction between members	Lack of face-to-face, telephone, email interactions between members about practices in their unit or solving problems.
3. Rigidity of competencies	Lack of trust in the competencies of other members results in resistance to learn from and adopt practices developed by others.
4. Lack of identification with the CoP	Participation in the community is not perceived as meaningful for the daily work. Others are not perceived as peers.
5. Practice intangibility	Members fail to communicate their practices in meaningful and concrete ways, thus limiting engagement between each other.

Probst and Borzillo discuss how the “Ten Commandments” are closely aligned to the change management principles. Particularly, setting strategic objectives (point 1) and dividing objectives in sub-topics (point 2) are analogous to setting a vision and providing a clear path for going through the change process. The difference within CoP is that strategic objectives are established by the members themselves and are then ratified by governance committees and sponsors (point 3). The sponsor and leader as control agents (point 4) may act as steering and evaluating the change effort. The driver role of the CoP leader (point 7) is analogous to the leadership skills of motivating, inspiring, coaching and learning facilitators required to drive change. Points 9 (providing the sponsor with measurable performance) and 10 (illustrate results for CoP members) resemble the final stages of successful change management involving top management recognition and dissemination of change benefits throughout the organisation.

The authors however note a significant difference between guiding CoP and driving a change process in relation to top management formal authority over the process. In a change management process authority is exerted from the top with clear targets and objectives. CoP are starkly different in this regard, as they set their own objectives within the organisation corporate strategy and in return are supported by top management. Control is here indirectly exerted through organisational resources. Within the CoP context the role of the sponsor liaising between the management and the CoP is critical. The sponsor should ensure that the CoP objectives are framed within the organisation corporate strategy, should regularly monitor progress towards objectives and should report the CoP results to top management to secure resources. At the same time, the leader(s) should coordinate the activities on the community and facilitate best practice transfer.

2. Applying Community of Practice literature to the Healthy Ageing Challenge CoP

This section will provide a rapid evidence assessment around some of the core dimensions facing the Healthy Ageing Challenge Community of Practice, managed by the Centre for Ageing Better. These dimensions include:

- a) Size of CoP
- b) Diversity of projects
- c) Digital CoPs

Wenger, E and Snyder, W.M., 2000. Communities of practice: The organizational frontier. *Harvard business review*, 78(1), pp.139-146.

Wenger, E., McDermott, R.A. and Snyder, W., 2002. *Cultivating communities of practice: A guide to managing knowledge*. Harvard Business Press.

CoP differ from project and operational teams for a variety of reasons. A project team is established to achieve specific objectives and ceases to exist once the project is completed. Additionally, participants are formally assigned roles and responsibilities, usually clearly established and communicated. A CoP on the other hand brings people together around a specific domain of interest and does not delineate specific roles and responsibilities for its members. Moreover, the success of the CoP is not measured in terms of progress on a particular project timeline, but in term of practices developed and exchanged within the community. The CoP does not cease to exist as a project team, but lasts as long as it is beneficial for its members and the organisation.

Additionally, in group projects, members are selected by management on the basis of their abilities. CoP tend to come together informally, and membership to the community is self-selected with members joining on the basis of their competencies relative to the domain. Whilst project teams are managed around objectives and timelines, CoP set their own agendas and establish internal leadership systems.

CoP can take different configurations, often shaped and determined by the situations which give rise to them. A well-known example reported by Wenger and Snyder illustrates how CoP were established at Chrysler when the company decided to reorganise its functional departments into car platforms (such as small cars; minivans). In order to prevent the loss of functional expertise, senior managers and engineers formed CoP called “tech clubs” bringing together experts with the same functional knowledge from different car platforms. Tech clubs are responsible for developing the Engineering Book of Knowledge, collecting information on compliance standards, supplier specifications and best practices.

This example illustrates how CoP were formed along functional expertise across divisional boundaries. Elsewhere CoP can exist within a single business unit or can span across different organisations. When it comes to the size, CoP may have only a dozen members up to hundreds of members. As illustrated in the “Ten Commandments” above, large CoP need a core group of participants leading the community and may need to be subdivided by topic or geographically to enable practical and meaningful members interactions.

Kerno, S.J., 2008. Limitations of communities of practice: a consideration of unresolved issues and difficulties in the approach. *Journal of Leadership & Organizational Studies*, 15(1), pp.69-78.

Kerno (2008, p. 71) lists the structural components of CoP as follows:

Population size: can vary from a few members to hundreds. As the community grows in size, CoP are likely to divide into subdivision either based on geography or on subtopic to optimise membership activity and experience.

Longevity: development of practice may vary from few years to several centuries.

Means of member interaction: although communities generally develop as people are co-located and regularly interact together, new means of communication allow for development of geographically dispersed and virtual CoP.

Product vs. process: CoP may bring together individuals with similar knowledge and background based on the same functional responsibilities (i.e. engineering, marketing, human resources); CoP may also be formed along product lines and projects where people with different functional responsibilities share a common product/project responsibility.

Intra- vs. inter-organizational: CoP may be developed within an organisation, at business unit level or spanning across departments and divisions. CoP may also extend the boundaries of the organisation, particularly in fluid and rapidly changing industries where peers share knowledge and resources.

Source: Compiled from Wenger (1998), Wenger, McDermott, and Snyder (2002), and Scott (2003).

Webber E, Dunbar R (2020) The fractal structure of communities of practice: Implications for business organization. *PLoS ONE* 15(4): e0232204.

Recent work conducted by Webber and Dunbar (2020) explored how the size of the community impacts on its structure and levels of interaction. The study based on 130 CoP illustrates how small CoP (up to 40 members) can be managed democratically, but larger CoP (over 40 members) require formal team leadership structures. Added to this, consistent with personal social networks, as the size of the CoP increases, the frequency of interactions among members declines.

The scholars observe how the size of the CoP influences the experience of its members. Generally, small CoP have a stronger feeling of intimacy and camaraderie shaping a feeling of belonging. Being able to meet more frequently fosters stronger bonds among members, strengthening member's commitment and retention. Webber and Dunbar (2020) argue how committed members may not require formal managerial interventions for coordinating the community activities as the feeling of belonging and members' commitment facilitate the CoP functioning. Added to this, the types of activities available differ among small and large CoP. Small CoP tend to engage in face to face discussions, sharing information, "brown bag" sessions, social events and collaborative projects. On the other hand, large CoP may engage in training, showcases, career opportunities, news-letters, conferences and forum discussions. Large CoP require formal management in terms of time allocation and task coordination, and strongly depend on a management committee dedicating time and efforts to the task. Webber and Dunbar (2020) identified time constraints as major challenge to CoP achieving full potential. Accordingly, the scholars suggest that organisations should support CoP management committee members by freeing up their time, rewarding, sponsoring and incentivising their dedication.

Barnett, S., Jones, S.C., Bennett, S., Iverson, D. and Bonney, A., 2012. General practice training and virtual communities of practice-a review of the literature. *BMC family practice*, 13(1), p.87.

Virtual Communities of practice (VCoP) provide the advantage of bringing together geographically dispersed employees, enabling them to share knowledge and solve problems. A literature review on virtual CoP (VCoP) in General Practice training, identified evidence-based principles for guiding the construction of VCoP in the health sector. The findings validate the principles advanced by Probst and Borzillo (2008) in the “Ten Commandments”. In addition, the review identifies important considerations for effectively establishing and managing VCoP in relation to technological implications.

The review highlights how technology should be “easy” in terms of ease of use, ease of access and flexible options for communication.

Communication may be asynchronous (email and discussion boards) or rely on mix-methods including chats, content sharing and synchronous web meetings.

Notably, whilst training was in some cases deemed important, in other cases training was avoided through simplicity of design.

Additionally, although virtual communities may function exclusively online, face-to-face meetings may strengthen members’ bonding, thus a blended approach may provide optimal results.

Noll, J. and Beecham, S., 2019. Creating Communities of Practice. Lero Technical Report TR_2019_03, Lero The Irish Software Research Centre.

Important key principles for creating and managing CoP are synthesised by Noll and Beecham (2019) as part of work for the Irish Software Research Centre. Drawing on both academic and practitioner evidence, the key steps for creating a CoP are:

1. A *topic* with tangible benefits for both participants and the organisation. A manager or a business unit – with a stake in the topic- is likely to act as sponsor for the CoP.
2. Identify and appoint a *founder* responsible for creating the community and recruiting members – usually from an existing informal network.
3. Provide *support tools* for facilitating and managing communication among members, and for storing and archiving the knowledge developed within the community.
4. Exercise *patience*, as CoP need time to grow and develop into functioning knowledge groups.

Important to successful CoP is the definition and delineation of members with specific roles, including:

- The founder, who establishes the community and recruits initial members. This should be passionate and have decision making authority in relation to matters around the CoP.
- The sponsor, providing management support.
- The coordinator, helping potential members in finding a common ground, sharing knowledge and solving problems together. The coordinator is usually a well-respected and well-connected member.
- Active members, regularly participating in discussions and knowledge creation.
- Peripheral members, participating occasionally or passively.

Critical to the establishment of CoP is management support, providing time, space and resources, particularly technical support for the community infrastructure.

Additionally, Noll and Beecham (2019) identify three main kinds of interactions within VCoP, supported by different communication and knowledge exchange tools:

1. One-to-one conversations: for example, between a community member and a domain expert. These are supported by email, chat, online directories and community “yellow pages”.
2. One-to-many exchanges: for example, when community members ask questions and request assistance on a topic to the whole community. These take place in forums.
3. Group discussions (many-to-many exchanges): here the community discusses solutions, shares experiences and best practices.

Donaldson, J.P., 2020. Building a digitally enhanced community of practice. *Information and Learning Sciences*. Vol. 121 No. 5/6, pp. 241-250

Within the context for the Covid-19 pandemic, Donaldson presents a set of design principles for building digitally enhanced CoP. An integrative literature review provides a set of evidence-based principles categorised in 26 crucial design principles and 8 desirable design principles. When designing a VCoP practitioners should consider the unique context and apply these principles accordingly as their prominence may vary according to the circumstances.

Crucial design principles:

- **Compelling philosophy:** such philosophy should be embedded in the community’s activities, and communicated in accessible form on the CoP website, as well as reiterated throughout the community’s events.
- **Shared goals:** clearly articulated goals should be consistent with the design of the CoP
- **Evolving focus:** CoP are not static but in continuous evolvement; thus, the design should facilitate regular shifting of focus.
- **Organic growth:** the design should facilitate changes (growth or reduction) of structures and systems
- **Community autonomy:** design features should promote community autonomy, which in turn facilitates shared goals, evolving focus and organic growth
- **Collaborative effort:** the design should facilitate members’ engagement in problem-solving and meaning construction
- **Different levels of engagement:** the design should allow for and facilitate different levels of engagement, with a core group, an active larger group and a larger peripheral group.
- **Legitimise peripheral participation:** the design should not treat all members as core participants but should allow for different levels of participation. The design should welcome and value all participants, also those engaging only at peripheral levels.
- **Identity exploration:** the design should allow the community to explore, define, negotiate and re-negotiate its identity
- **Core leadership:** the design should facilitate the identification and appointment and core leaders responsible of facilitating members’ engagement and collaboration
- **Freedom:** the design should allow for structural and social freedom to revisit the social, cultural and political system of the community
- **Organisational sponsor:** the organisation should formally acknowledge the value and identity of the community

- **Personal relationships:** the design should facilitate long-term personal relationships between members
- **Autonomy and self-determination:** a non-hierarchical atmosphere and a risk-free environment should foster autonomy. Members shall also be able to discuss their roles in terms of anonymity and sharing of information.

These crucial design principles involve the following technology considerations:

- A VCoP should have a common entry point, usually a community website
- A VCoP should rely on easy and diverse technology, ranging from the more traditional (phone and email) to more complex (social networks, videos, microblogs such as Twitter, group communication apps and photo sharing).
- A VCoP should adopt both open and close communications, so the design should provide both public and private spaces.
- A VCoP should have clearly defined engagement guidelines, communicating how the community engages members along with rules and expectations.

Donaldson (2020) identifies critical processes and activities for the success of the community including:

- Face-to-face events.
- Virtual synchronous activities such as videoconferencing.
- Signature events embodying the philosophy of the community. These allow opportunities for meeting people and identify core issues for collaboration.
- Boundary spanning integrated in the design through planned interactions, as CoP interact with others in a rich landscape of CoP.
- Rhythm of engagement should be regular, with a pattern of activities, reflection and contributions.
- Collaborative framing activities, allowing the construction of shared meaning, issues, goals and identity.
- Reification and embodiment of implicit knowledge into “thingness”, the community artifacts.
- Role negotiation, as members can act internally as information sourcing, guidance, or externally as publishers of information, public relations and inter-CoP engagement.

IdealState 2018. Driving Successful Virtual Communities of Practice in Your Organisation. Accessed 29th July 2020. Available at: <https://www.idealstate.co/blog/driving-successful-virtual-communities-of-practice-inside-your-organization>

In a practitioner oriented publication, Ideal State presents critical CoP facilitation guidelines. Underpinning the guidelines for effectively managing VCoP is the consideration that the community must generate value for both the organisation and its individual members.

The main guidelines for VCoP facilitators are:

- Empowering members to set their own objectives and take ownership of the community's learning and development of practices.
- Dedicate time to ensure the community remains relevant for all members and lead by example.
- Regularly assess members' needs and interest, identify subject matter experts and coordinate members' roles.
- Avoid group thinking and encourage debates and questioning of the status quo.
- Balance learning oriented activities (i.e. finding solution to problems) with producing activities (generating best practices, guidelines and standards).

Additionally, in order to sustain members' engagement over time, Ideal State provides the following recommendations:

- Monthly or bi-monthly calls with presentations and “round-ups” around important topics.
- Quarterly newsletters to all members or interested staff.
- A “special guest”, with an expert answering questions from the group.
- Have members with special expertise or relevant experiences to post blogs.
- Have a challenge or contest to generate ideas or solutions around topics of interest to the community.
- Set a “cost-of-membership” system, where in order to remain in the community, members have to document at least one practice per year or post a certain number of questions and responses.
- Hold an annual in-person meeting with top CoP contributors.
- Incentivise group contributions with non-financial rewards.
- Formally recognise member's participation as part of annual performance appraisal.

The concept of Landscapes of practice may be useful for the Centre for Ageing Better as more organisations join the project. The concept of *Landscapes of Practice* (LoPs) explains how different CoPs may interact, depend on, and be accountable to one another's practice-based knowing, rather than relying exclusively on their own, local situated practices.

Appendix 2: Details of evaluations reviewed

(Copies available on request to interested parties)

Title	Evaluation Objectives	Methodology	Methods	Limitations	Further information
National Community of Practice for Supporting Families Evaluation	State and national consensus on a nation framework Enhanced state policies, practices and systems to support families Develop model to support families	Drawing on Wegner et al (2011), promoting and assessing value creation	Environmental scan Reporting tool with closed and open-ended questions Telephone interviews based on reporting tool Observation Expert interviews	Descriptive, little account of learning processes – few examples offered in report Retrospective Timing of evaluation	
Peak body representing the community-based mental health sector in WA. Community of Practice End of Project Evaluation Report	1. What did the project aspire to do? 2. What happened? 3. What was the impact? 4. Future aspirations	Theory of change Description of process Draw on Wegner et al (2011) Indicators Value creation stories	Online end-of-project questionnaire Indicators Telephone interviews on value creation stories Analysis of blog posts		CoP operated with a deficit perspective Examples of value creation stories in clear framework
Dialogue Community of Practice Evaluation In supporting the development of individuals and their work towards public services transformation	Provide opportunities to learn and become skilful at dialogue practices Provide opportunities to practice these skills	No overall methodology presented	Telephone and face-to-face interview Learning logs Newsletters Online questionnaire Digital stories Presentation Stakeholder interviews Frequency use of resources	No overall methodology or assumptions presented	
Global Reading Network	Develop CoP Build & disseminate evidence Test tools and ToC Develop innovation Conduct training	No overall methodology presented	Document evaluation 11 interviews, 4 focus groups Survey n=395	No clear model	PowerPoint presentation only available, cannot find full report
Implementing & evaluating a Community of practice for Health visiting	Develop skills Create learning culture Demonstrate effectiveness health visiting	Action research Practice development Action learning Co-researchers	Action learning sets Telephone conferences Workshops Session notes Member-checking findings	Focus on learning set, and self-reporting by participants. Few measures. No CoP methodology	Use number of tools presented. Good use of action learning sets
Office of Human Resources at the University of	Help decide future of CoP as talent	Kirkpatrick Levels of Impact Model	Meeting notes Guided reflection Web-based survey	Focus more on correlation and causation between	Quantitative and qualitative indicators framed against

Wisconsin-Madison	development strategy Narrative impact on individuals & organisation of CoP Pilot CoP evaluation methods	Wenger's Elements of CoP		Kirkpatrick's 4 levels of impact	the models of CoP Creative presentations Good self-reflection and suggestions for CoP development
Reducing Violence Against Women & Their Children Grants Program	Evidence around CoP sharing resources in specific field Recommendations for funders of CoPs	Process – how did workshops go Impact evaluation – benefits Focus on indicators of learning	Description of meetings Facilitator and participant reflections Post-session surveys Summative evaluation surveys Focus groups	Limited model for learning within CoP No reflection on CoP evaluation	Very details Surveys in appendix
Resilience Measurement- mel Approaches In practice	Understand challenges in operating resilience measurement Used to develop CoP		Case studies Theoretical analysis	Aiming at understanding challenges as precursor to setting up CoP	
Developing Talent Management Communities of Practice		How are you feeling How was today What are you still curious about	Description of sessions	Not full evaluation, more capture basic processes	PowerPoint presentation not full report
An evaluation of contract delivery of the department for education school workforce contract	Help teachers access practical support Help schools appraise approaches Commission external expertise Embed good practice	Description of key theory of CoP, Network learning and collaboration Not developing into overall model	Survey	Focused on the content but not the process of the CoP – therefore little evaluation of CoP itself	Most focus on resources
System change through situated learning: Pre-evaluation of the Health Innovation Network's Communities of Practice	(How) is the momentum towards transformation sustained and what are the wider dependencies that are needed for this to happen? (How) is progress and value-added measured? (How) is the rhythm of learning sustained? (How) are cultures and principles	Model for CoP including process evaluation questions Developed maturity model	Document reviews Semi-structured interviews ToC workshop Survey participants Synthesis findings	Scoping and development work, seeing opportunities for further funding to develop evaluation tools and approaches	Well grounded theoretically Clearly constructed research questions and approach

	nurtured and sustained?				
Greater than the sum of its parts: What works in sustaining community-university partnerships	Conceptualisation of Connected Communities Role civic engagement Process promoting engagement Landscape community research	Use social learning theory – framework to structure evaluation process	Qualitative interviews Focus groups Memory stories Data		Contains interview schedule and memory story instructions

Appendix 3: Summary of methods used by evaluations reviewed

Title	Interviews	Survey	Observation	Data collection	Other/novel approaches
National Community of Practice for Supporting Families Evaluation	Interview schedule Focus on impact of programme	Full survey included Impact on programme and services MCQ and some open text	Observation protocol Prompts from previous data	No protocol listed, just list that it completed	
Peak body representing the community-based mental health sector in WA. Community of Practice End of Project Evaluation Report	To capture value creation stories – structured around immediate value, potential value, applied value and realised value			Example of how data can be displayed	Theory of change and major focus on value creation stories
Dialogue Community of Practice Evaluation In supporting the development of individuals and their work towards public services transformation	Interview schedules of experiences of groups and stakeholder interviews	Online questionnaire (appears to be open text)		Content analysis of data, learning logs etc	
Global Reading Network			Only PowerPoint presentation so no information about the methods		
Implementing & evaluating a Community of practice for Health visiting					Project used co-researchers and action learning sets
Office of Human Resources at the University of Wisconsin-Madison		Web-based survey improvement evaluation of CoPs at the Asian Development Bank (Yu 2009)			Meeting notes Guided reflection
Reducing Violence Against Women & Their Children Grants Program	Focus group questions around impacts and counter-factuals	Post-session survey using Likert scales Summative evaluation using Likert scales and some open text			
Resilience Measurement- mel Approaches In practice	Interviews and focus groups but no interview schedule included	Baseline and continual survey			
Developing Talent Management Communities of Practice			PowerPoint – no details included		
An evaluation of contract delivery of the department for education school workforce contract			No methodology discussed		

System change through situated learning Pre-evaluation of the Health Innovation Network's Communities of Practice	Interviews conducted but questions (do not appear) to be listed	Survey questions on Likert scale (good presentation of data)			
Greater than the sum of its parts: What works in sustaining community-university partnerships	Interview schedule History with partnership Daily reality Impact skills and working experience Future with partnership				Memory story about what learnt