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Jørgensen, Rasmus; Edwards, Kasper

Publication date:
2017

Document Version
Peer reviewed version

[Link back to DTU Orbit](#)

Citation (APA):

Jørgensen, R., & Edwards, K. (2017). Developing communities of practice in health care. Paper presented at IFKAD 2017, Russian Federation.

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Developing communities of practice in health care

Rasmus Jørgensen*

Department of Management Engineering
Technical University of Denmark
Building 424, room 116
2800 Kgs Lyngby
E-mail: rajor@dtu.dk

Kasper Edwards

** Corresponding author*

Structured Abstract

Purpose

Standard operating procedures (SOPs) are a part of healthcare operations but relying on explicit knowledge is not necessarily sufficient to continuously adapt and improve processes. The theory of communities of practice (CoP) proposes an approach to knowledge sharing that could supplement the use of SOPs. A CoP is a social community formed around a practice (e.g. ICU nursing) which induce a propensity to share experiences and thereby constitute knowledge sharing (Lave & Wenger 1991; Brown & Duguid 1991).

CoP was conceived as a descriptive construct but has gained popularity and is found to improve practice performance, but knowledge about developing and measuring CoP is lacking (Ison et al. 2014).

We propose a method to develop a CoP and the method is tested in a blood analysis unit at 'Nordsjællands Hospital' in Denmark.

Design/methodology/approach

The interventions were identified from current CoP research. Interventions were initiated just after baseline measurement.

The following interventions took place: The practice was operationalized narrowly as employees performing a specific operational task. The practice was chosen due to a high frequency and recurring problems. A voluntary CoP coordinator was identified. She then invited her colleagues to participate in the CoP and arranged CoP meetings..

The 'Event Effect Method' was used to control for effect modifiers by identifying events both part and not part of the intervention and estimating their effect on CoP.

Originality/value

The development method improved knowledge sharing and the SOP. The method confirmed some earlier findings regarding CoP development and raises new questions regarding participant engagement, researcher role and start-up workshop.

Practical implications

The results indicate that knowledge sharing within operations can be improved by considering tacit and explicit knowledge sharing as supplementary.

Keywords – Communities of Practice, best practice, health care

Please for the full paper submission category indicate the nature of the proposed

paper: Academic Research Paper

1 Introduction

Many public organizations are required to work accordingly to standard operating procedures (SOPs) that must be updated continuously. Managing knowledge under these circumstances involves overcoming the duality of continuously establishing and breaking up routines. This duality can be observed in healthcare which is characterized by a legal requirement to adhere to standards and also continuously adapt in response to changes in e.g. equipment and procedures, adversities and to improve productivity. For practitioners this means that they must continuously perform their practice as described in the SOP and developed new practices when adapting to changes or new insights.

Standard operating procedures (SOPs) are written prescriptive procedures for practitioners to follow, and SOPs can be used to implement best practice and as a knowledge repository. But the development of practice and SOPs can benefit from practitioners that share experiences and develop their practice collectively (Orr 1996). Also, as knowledge sharing involves tacit elements of knowledge that is gained through contextual experience, explicit knowledge sharing could benefit from practitioner discussions and interactions. A management approach must then support that practitioners develop their practice by sharing experiences and tacit elements of knowledge, while adhering to the requirement of documenting in SOPs. A supplement to the explicit knowledge in SOPs could be Communities of Practice. The theory of Communities of Practice is known for inducing a propensity to share and develop knowledge as practitioners interact and build relations, share ideas and discuss experiences (Brown & Duguid 1991).

Today models describing how Communities of Practice function, steps for implementation, methods for measuring and circumstances for their success are being studied (McKellar et al. 2014; Aljuwaiber 2016). However, the understanding about how to facilitate the development of communities of practice is still incomplete (Li et al. 2009b; Ison et al. 2014) and could benefit from empirically tests (McKellar et al. 2014). This study aims to contribute to the field of CoP with knowledge about what might develop a CoP within an operational setting with SOPs being used.

In order to do so we propose a method to develop CoP and the method is tested in a blood analysis unit at 'Nordsjællands Hospital' in Denmark and the effect on knowledge sharing within operations is evaluated.

To develop the CoP the following interventions took place (See figure 1): The manager was introduced to CoP theory. The practice was operationalized narrowly as employees performing a specific operational task frequently and experiencing recurring problems. A voluntary CoP coordinator was identified and introduced to CoP theory. She then invited her colleagues to participate in the CoP. The facilitator arranged the start-up workshop where CoP participants were introduced to the timeline, the purpose of the CoP and templates. The facilitator arranged the following CoP meetings and updated the SOP when needed.



Figure 1 – Interventions part of the method for developing the Community

2 Background of Communities of Practice

A Community of Practice is a group of people who interact on an ongoing basis to share knowledge and expertise about common practices, problems, or topics (Wenger et al. 2002). From its conception in 1991 (Lave & Wenger 1991) the definition has shifted from focusing on personal development to fulfilling organizational goals (Li et al. 2009a). This study is in line with the latter CoP focus since the to develop individual practice to the benefit of a workplace.

Communities of Practice was conceived as a descriptive theory describing how employees developed and shared knowledge through interactions, either embedded in the work or during informal gatherings (e.g. talks about experiences during a lunch break) (Lave & Wenger 1991; Orr 1996). Today CoP theory is applied prescriptively to support knowledge sharing and development (Aljuwaiber 2016), including the elements involved in CoP processes and development (Li et al. 2009b). To inform the design of the CoP development method a study of the current research within the field was undertaken and the findings are presented below.

Management support appears to be important for CoP development. Iaquinto et al. (2011) evaluates six purposefully established CoP and they find that support from management is related to the most successful CoP. Also Hemmasi & Csanda (2009) and Fung-Kee-Fung et al. (2014) find that management sponsorship and support have a role to

play in CoP development. The importance of formal relationship between CoP and management is highlighted by McDermott & Archibal (2010).

When the practice that the CoP is formed around is clearly defined and understood by members it has a positive impact on the CoP as this creates a common focus, defines membership and makes it easier to share ideas (Iaquinto et al. 2011). In choosing the practice it is important to consider what management and employees finds relevant to ensure support (Wenger et al. 2002). If the CoP practice is perceived as useful by the members then the CoP is likely to work better (Hemmasi & Csanda 2009).

A CoP co-ordinator is identified in several case studies (Barwick et al. 2009; Iaquinto et al. 2011; Wolf et al. 2011). In the case study by Wolf et al. (2011) the term “facilitator” is used and the subject matter expert for the practice is asked to fulfil the role. Barwick et al (2009) describes that the facilitator is responsible for among other things steward meetings, facilitate discussion/presentation and community building activities as e.g. reflective practice. These finding are in line with Iaquinto et al. (2011).

There are case studies of the role that CoP can play in spreading best practice described in SoPs and it appears that CoP can have an important role to play (Cordery et al. 2015; Schenkel & Teigland 2008; Fung-Kee-Fung et al. 2014; Thomson et al. 2013). Verburg et al. (2006) also suggest that one outcome of CoP is documentation and Wenger (2002) defines the practice of the CoP to include documents.

Face-to-face contact between CoP members appears important for the success of the CoP. In the study of several CoP in a large construction work Schenkel & Teigland (2008) finds that replacing physical contact with virtual contact deteriorates the CoP effectiveness.

The finding presented above has been synthesized in to a CoP development method which is tested through a case study.

3 Case description

The case company was chosen due to the researcher’s relation to the established through previous collaboration. The case is relevant for this study because the work at the analysis equipment is shared between many different employees, who most have a standardized practice and also develop the practice based on everyone’s experience.

Prior to the interventions the current state of knowledge sharing and SOP was mapped based on 4 semi-structured interviews with employees and observing two different employees in their work and taking notes continuously.

The employees of the blood analysis unit are called bioanalysts and are divided into three categories:

- Operators: 26 bioanalysts. They are responsible for daily operations which mainly involve running analysis equipment and collecting blood samples from patients.
- Specialists: 6 bioanalysts. They are practice experts within separate parts of the analysis process and are responsible for training and problem solving on the line. They are part of the daily operations and have the same responsibility as the operators.
- Faglig koordinator (FK): 2 bioanalysts. They are responsible for updating SOPs. They are not part of the daily operations and have an independent office but share coffee breaks and lunch with the operators and specialists.

The talk about work is embedded in the daily work life where bioanalysts ask questions, reply to them, and solve ad-hoc problems. Bioanalysts and their manager have meetings where the current status of work is discussed from different aspects. Examples of meetings are morning check-in, handover in the afternoon, and weekly department meeting.

The department is running 24/7 and are under budget constraints making it impossible to gather all employees at once. Also, patient contact and intensive care tests make it challenging for people to meet at a specific time.

In Danish healthcare it is a requirement to document processes in SOPs and for the practice a SOP existed. This practice was a weekly maintenance task on equipment called STA-R (Illustration 1) which is used for analysis of coagulation, and the maintenance task had a reputation among bioanalysts for being difficult.



Illustration 1 – On the picture to the left a bioanalysts can be seen during maintenance of the STA-R. The interior can be seen of the picture to the right.

4 Method

4.1 Case study

The purpose of this study is to test a method for developing a Community of Practice through empirical research based on a single case study.

4.2 Method

CoP level was measured at baseline and at follow-up 13 weeks after the intervention (See figure 2). Just after baseline measurement the community developing interventions were initiated. Process performance data and the procedure describing the practice (SOP) were collected at baseline and at follow-up.

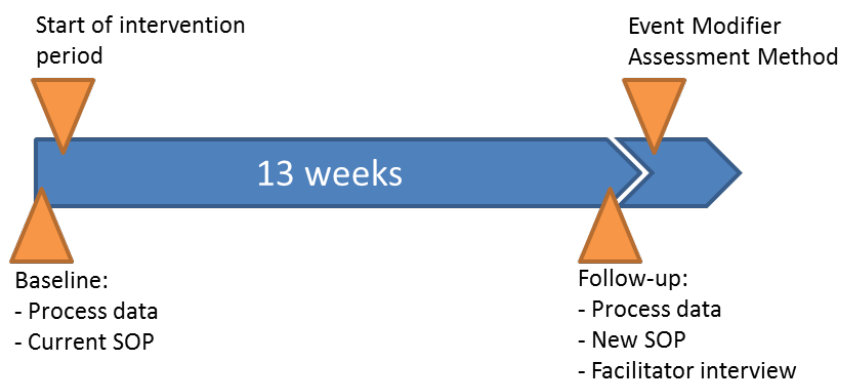


Figure 2 – Method for the case study

The 'Event Modifier Assessment Method' (Edwards & Winkel 2016) was used to control for effect modification by identifying events both part and not part of the intervention and estimating their effect on CoP. This was done during a workshop with CoP participants subsequent to the follow-up measurement.

5 Results

5.1 Community activity and organisation

The interventions led to the establishment of a group of bioanalysts of which two were specialist. Four meetings were held over a period of 13 weeks (See **Table 1**) and in between meetings the participants were active in developing the new SOP and seeking feedback from colleagues.

Meeting	1	2	3	4
Participants	A, B, C, D	A, B, C, D	A, B, C	A, B, C

Table 1 – CoP meetings and participants. Participant A was the facilitator. Person D was involuntarily absent the last two meetings.

The community was designed to act as a knowledge-sharing arena where bioanalysts were invited to participate voluntary. FKs were excluded from participation due to their lack of practice experience. The set-up can be seen in Illustration 2.

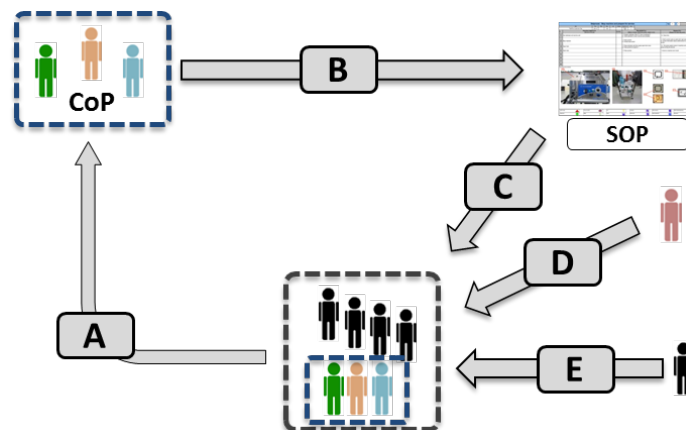


Illustration 2 – The complete workforce was invited to participate in the CoP (A). The CoP was responsible for the SOP (B), and for collecting input from the SOP use (C), other CoP members (D) and colleagues (E).

5.2 CoP effect

As part of the intervention the CoP participants were given the task of reviewing the existing SOP and changing it according to how the participants could agree the practice was done.

Below the pre-intervention SOP (From now on referred to as the ‘Old SOP’) can be seen in Illustration 3 and the post-intervention SOP (From now on referred to as the ‘New SOP’) can be seen in Illustration 4. The layout of the SOP was changed based on the training received during the start-up workshop and the CoP participants defined the content.

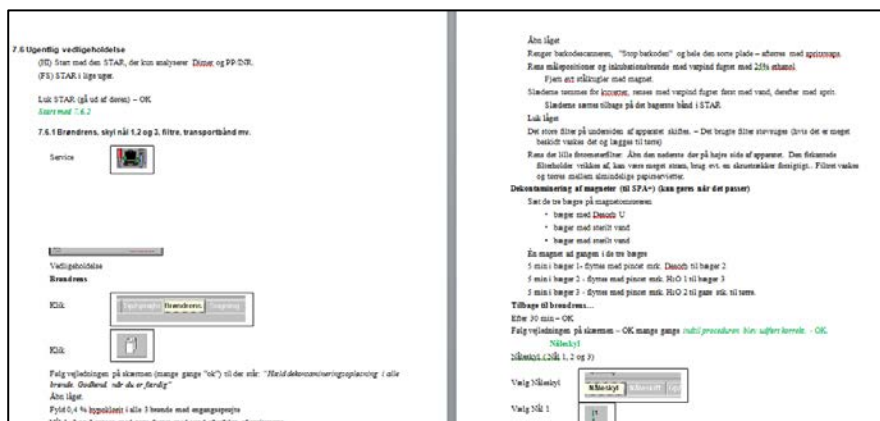


Illustration 3 - Page 1 and 2 of the pre-intervention (Old) SOP

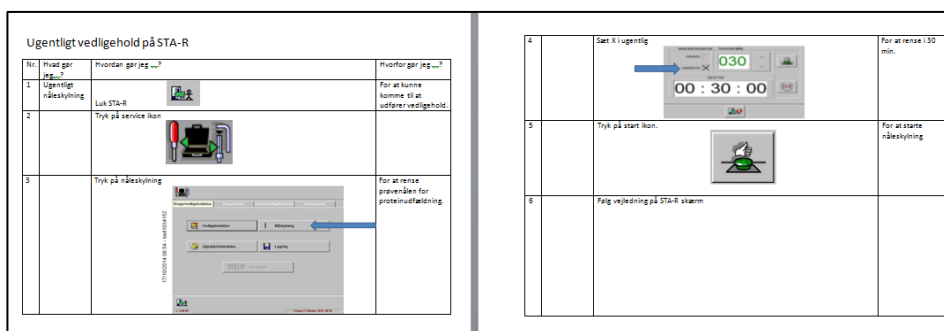


Illustration 4 - Page 1 and 2 of the post-intervention (New) SOP

Besides the changes in layout the written content has changed both in terms of words and sentences (See Table 2). One reason for the increase is that the new SOP layout divided the context into what, how, and why and the participants reported that including the why (The reason for a certain action) was new to them. In the old SOP very few cases of explaining why something is done can be found.

	Old SOP	New SOP	Diff [%]
Words	571	771	+26 %
Sentences	62	80	+23 %

Table 2 – The change of SOP context

The practice description has changed both in terms of the task sequence and how things are named. One noticeable change of sequence is that in the new SOP “cleaning needles” is done before “cleaning wells” in the old SOP it is was opposite. When the coordinator was asked to explain the difference she replied:

“Cleaning wells is only done weekly and therefore something you rarely do leaving many insecure about it. Maybe they do it every six months. Cleaning needles is done every day so you know it and feel confident about doing it. So instead of starting with the difficult task we now start with the easy, then you can clean the needles and go for your coffee break and then start the well cleaning” (Translated from Danish).

So the reason for the change in sequence was knowledge about how the task felt doing. The CoP participants had identified the task sequence they found made their colleagues feel good (or less bad) about doing the maintenance. This was done through a consideration that bioanalysts rarely do the job and that the coffee break can be a way to relax one self before doing something difficult and also to ask for help.

Illustrations in the SOP such as screen dumps from the software and pictures from the machine is used to support the text. The use of these illustrations has increased. In the original SOP there was 0 pictures of the machine and there were 20 screen dumps from the software and in the new SOP there are 6 pictures and 19 screen dumps. An example of the pictures used in the new SOP can be seen in Illustration 5.

7	<p>Sæt raket forsigtigt ind forfra på STAR med strekkoden forrest, og skub det ind til raket kører selv.</p>  <p>Nålen skylles nu i 30 min. Følg vejledning på skærmen. Når den er færdig kører raket ud igen.</p>	<p>Strekkoden skal forrest for at raket vender korrekt.</p>
8	<p>Fjern raket ved at føre raket helt frem og vip det af.</p>	<p>2.8 Raket kan ikke fjernes på anden</p>

Illustration 5 – Example of how pictures are used in the new SoP. This picture shows how to push a rack back in to position and the blue pictures indicates the direction.

When asked about the use of pictures in the SOP the coordinator replied:

Pictures make it easier to know what to do. When you haven't done the maintenance for a while then it can be difficult to remember what the "well" is when you have to refill hypochlorit. A picture makes it easier to follow the SOP. (Translated from Danish).

Since a bioanalysts only encounter the maintenance task approximately every six months then reading the word "well" does not prompt a picture of the object inside the STA-R. The pictures of reality make it easier to identify the physical object that they are supposed to interact with. The picture in combination with the word "well" used in the SOP might increase the chance that the object is also recognized by its name from now on.

The number of screen dumps is approximately unchanged but the use of screen dumps has changed. In the old SOP screen dumps were small parts of the screen and in the new SOP screen dumps are larger and supported by arrows indicating where to press or write. An example of the difference in use can be seen in Illustration 6. The explanation for the change provided by the coordinator was similar to the explanation provided about the use of pictures.



Illustration 6 – Screen dumps from the old SOP (to the left) and the new SOP (to the right).

5.3 Process performance

The time used on doing the maintenance task was collected before and after the intervention and the collected data can be seen in Table 3. The reasons behind the change in length could not be identified. The feedback from bioanalysts about the new SOP was that it was easier to follow, thus one could speculate that before the new SOP parts of the maintenance was skipped unknowingly.

	Average	Observations
Before intervention	01:31:00	14
After intervention	01:48:00	5
Change	+17 minutes / 19%	

Table 3 – The length of doing the maintenance task as reported by the bioanalysts.

5.4 Event modifiers

During a workshop with two CoP participants the ‘Event Modifier Assessment Method’ was applied. The CoP was identified as a significant event together with a range of other events within the last 13 weeks.

When asked what had influenced work processes and SOPs the CoP with voluntary participation and the change of SOP layout was among the identified events. The workshop participants explained that since it was voluntary they didn’t waste time figuring out what they had to do; those that showed up had already tuned in on the purpose. Also, they explained that making participation voluntary is a way of avoiding people showing up that “*don’t really care*”.

When asked what had influenced knowledge sharing two events were identified; dividing the SOP text into what, how, and why and that meeting in a small group made it possible to exchange experiences with a specific focus. The participants explained that due to a hectic pace at work it is difficult to have the kind of discussion that the CoP provided them the opportunity to have.

6 Discussion

There are a number of case studies where Communities of Practice are developed purposefully; however, there is not agreement about a common CoP development method. This study reports on a CoP development method based on current research that is tested empirically, and contributes with insights about how to develop a CoP within operations in healthcare and how CoP can contribute to improve operational knowledge sharing.

It was demonstrated that the established CoP improved knowledge sharing. The knowledge was contextual in the sense that it was only something that could be acquired through being embedded in context. Re-organizing the job sequence according to how it feels to do the job and also taking into consideration the spontaneous CoP during coffee break are examples of this. The value of contextual knowledge becomes clear when comparing the before-SOP with the after-SOP; the before-SOP made by non-practitioners only described actions, the after-SOP made by practitioners described actions and consider how to execute them.

The Results seem to suggest that CoP should be consider as an integral part of an operational knowledge management strategy to promote and develop best practice. This is in line with other studies this (Cordery et al. 2015; Schenkel & Teigland 2008; Fung-Kee-Fung et al. 2014; Thomson et al. 2013; Barwick et al. 2009). One approach could be to consider CoP to support the Interpretation and Experimenting activities of organizational learning (Zietsma et al. 2002).

Elements of the CoP development method was identified by practitioners during the workshop and the voluntary participation, the facilitator and having time set aside during CoP meetings seems to have a positive impact on the CoP. A different approach to planning the CoP activity and a different start-up workshop could probably have improved participant engagement and support a long-term change. Also, the role that the researcher played in introducing and promoting CoP within an organization could also be

considered in a CoP development method. The move towards a uniform method for CoP development could be made easier by dividing the method into characteristics, processes and outcomes as proposed by Verburg & Andriessen (2006).

The theory of CoP has received criticism for not taking enough consideration of the relation between power and knowledge (Hislop 2009). During the intervention period one of the FK had a negative reaction toward the CoP and felt left outside, and a future CoP development method should take more consideration of the relation between power, influence and knowledge.

7 Limitation

This study has limitations and one is that this it is a single case study. Also, the effect on process performance is unknown and more data over a longer period is needed.

The study only lasted 13 weeks. Future studies should be longer and follow up on the long-term effect on knowledge sharing, development of relations between CoP participants and process performance.

The daily work of bioanalysts is characterized by tasks that can be described from a-z e.g. doing maintenance, machine start-up, and standardized tests. Clearly this is not the case with nursing or social work thus the replication of the results should consider the context.

8 Conclusion

A CoP was developed and it had an impact on knowledge sharing within operations as well as the written SoP but the effect of process performance and long-term effect requires further investigations. The development method proved successful and the study gave valuable insights for further studies but also revealed shortcomings that require adjustment.

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