Improving Social Practice: Enhancing Learning Experiences with Support for Collaborative Reflection

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Improving Social Practice: Enhancing Learning Experiences with Support for Collaborative Reflection

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Abstract. In this paper we describe collaborative reflection as a core way of informal learning at the workplace. From three case studies we derived reflection on social practice as a good example for learning at the workplace. The way employees talk to third parties like patients or customers was observed to be a major topic in discussions within teams as it triggers the sharing of experiences about cases and fosters building of mutual understanding of common problems. We identified articulation to be a core part for this kind of reflection and derived requirements which were than implemented in a tool to support reflection on this topic focused on a healthcare setting and tested out application to reflect on talks with relatives of patients.

Keywords: collaborative reflection, learning at work, articulation, social skills

1 Introduction

Besides technology support for the collaborative learning and extension of knowledge, there are many skills that cannot be taught like e.g. physics but have to be learned by experiences made during every day work. Although there is an overlap between formal learning and learning by experience [5], e.g. when professionals compare knowledge from vocational training to their experience, there are many cases in which informal learning is the only way to create new insights on work practice. This is especially true for skills and capabilities, which are crucial for performing well in a job and delivering a suitable quality of work yet not taught well in education for this job. Typical examples of such skills are learning strategies needed to continuously stay on top of current knowledge needed for the jobs and social skills such as the ability to communicate and collaborate positively and successfully with colleagues, superiors, clients and other groups playing a role in daily business. For such skills, informal learning and learning form experiences is indispensable, as, for example, social practice cannot be learned but is a result of a continuous process of comparing own behavior to that of others.

This paper reports on a core way of informal learning at work, namely (collaborative) reflection. Reflection is a learning mechanism that transcends the

teaching of facts or the combination of different perspectives to create new knowledge. It rather suggests that re-thinking work practice in the face of current knowledge can support and improve future practice. However, although reflection has been recognized as a frequent and essential part of informal learning and there are hardly any insights into processes of collaborative reflection and their support by tools. This paper describes research aiming at closing the resulting gap. This work will be described in the remainder of this paper by the example of supporting the improvement of social practices at work.

The paper is organized as follows. First we describe a model of individual reflection and informal learning to then broaden the view on collaborative reflection and research done in that area so far. In section 4 we then draw on three case studies in different organizations[1]. Due to the lack of insights into collaborative reflection and in order to create an understanding of processes associated with it, the studies were conducted in an exploratory manner, including interviews with the groups described above and work observations. As an outcome, the studies shed light on collaborative reflection of social practice in particular (section 5) and on process characteristics of collaborative reflection in general.

2 Collaborative Reflection and Informal Learning at the Workplace

Besides situations of formal learning in dedicated sessions where knowledge is presented by teachers or facilitators learning at work is often rather informal [5]. It happens when we experience new views on our daily routines by either self-reflecting on who we do things or in discussions with others with whom we might compare or that have different perspectives. Learning then takes place when conclusions are drawn by comparing experiences with own knowledge or experiences of others. This is what we refer to as reflection.

Figure 1 Reflection model by [1]

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1   This work is part of the MIRROR project funded by the European Commission in FP 7. The MIRROR projects aims at supporting reflection in various settings, stages and levels. More information can be found at http://www.mirror-project.eu/.

Following [1] reflection can be defined as going back to past experiences, re-evaluating them with the background of current ideas or feelings and conclude with new perspectives and changes in behavior. According to [1] experiences are behavior, ideas and feelings towards these (see Figure 1**Fehler! Verweisquelle konnte nicht gefunden werden.**). Reflection means implicitly or explicitly remembering those experiences, the last time a work task was done, when it re-occurs and re-turning to how it was done e.g. by recognizing process steps that where burdening the last time, but seem easier this time. Reflection is then triggered by recognizing the differences and re-evaluating e.g. what caused them. What distinguishes reflection from rumination is that reflection leads to outcomes in form of new perspectives or changes in behavior that e.g. prevent situations in which a task re-occurs in an unwanted way. It needs to be stressed that the reflection process described is not linear. Instead there can be multiple iterations between remembering past experiences and their evaluation which can lead to a deeper understanding of the experiences.

Reflection is therefore closely related to problem based learning (cf.[13]) which does not require a link to past emotions and experiences. In addition reflection is not singly triggered by problems but can also result from positive experiences.

The vast majority of research on reflection is done on individual reflection and most models have a strong individual focus [9]. Collaborative reflection on the other can be described as "people engage in finding common meanings in making sense of the collective work they do" [8]. In difference to individual reflection those done in groups has a strong need for articulation of experiences, therefore research has to focus more on coordination and communication where sharing and mutual experiences are the core elements [4].

Learning by collaborative reflection may then occur when an individual links her knowledge to the experience of others [2] or when a group combines different viewpoints stemming from its members' experience and reflects on them collaboratively [8]. As characteristics of collaborative reflection [15] identified "critical opinion sharing" in discussions, "challenging groupthink" as opposed to stick to norms, "asking for feedback" on own actions and "experimenting with alternatives".

Those criteria also match situations in which groups collaborative rethink situations of social practice and interaction with third parties like customers since those situations are re-occuring in general but each episode is different.

3   Related work: Tools for Informal Learning and Reflection

Since reflection is based on going back to past experiences tools to support collaborative reflection and informal learning tools have been researched for quite some time to overcome limitations of fading memories and uncertain remembering. Various approaches were tested on their supportiveness.
One way is to use *additional hardware* and sensors that *automatically collects* data which afterwards can be used to support reflection processes. For example a SenseCam – a wearable camera that makes photos automatically – was used in [7]

and [6]. The latter with teachers in training and their supervisors to support reflection on lessons. The participants found the images of the camera to be valuable for grounding discussions and supporting them with empirical data. This made discussion with those that were not part of the lesson easier as it provided additional context information. Nevertheless the bad quality of the camera images and missing additional channels like audio made a extensive explanation of the camera wearing person mandatory.

Others require participants to *manually collect* information e.g. in [11, 14] articulations like diaries and portfolios proved their applicability and support for individual and team reflection. Personal notes were used to discuss the progress of a project after it is finished.

A third group of authors uses data that is *generated during regular work tasks*. In [10] the authors described how data from light-weight collaboration tools for software development can support the collaborative reflection on a project after it has ended. They used the project management tool *trac* that focusses on support for ongoing projects for a workshop in which students retrospectively reflected on the trajectory of their work. Here the empirical data was found helpful to review details of the project and discuss events in detail.

All tools developed show the usefulness of collaborative reflection to learn about past experience. Especially they point to the advantages of additional data to foster collaborative reflection (cf. [9]) and support memorizing situations. Nevertheless most of the tools focus on support for formal learning or separated trainings of professionals and require additional articulation work. Our studies focus more on informal learning and we will propose a tool that integrates data collection into daily work to keep the additional work as small as possible.

4 The nature of collaborative reflective learning: An Analysis

Do deepen our knowledge on reflection and especially collaborative reflection we organized case studies at three different sites from health care and business professions. For a deeper analysis of modes and types of collaborative reflection and tool support cf. [3]. In this chapter we will focus on collaborative reflection as a learning mechanism, derive requirements for tool support and review the cases studies from these perspectives.

4.1 Methodology

We conducted three case studies to deepen our understanding of collaborative reflection. The first case is a residential care home in Great Britain specialized on offering support for elderly people suffering from dementia. The second case is a medium sized IT consulting company based in Germany. Our study and analysis is based on observations and interviews in these cases. We conducted two day observations of two different people at the hospital and consulting company. Part of the observation was shadowing of participants during their workday and participation

in meetings. At the care home observation was limited to meetings due to concerns about residents' privacy. In addition we interviewed three to five participants at each of the case study sites. Although this paper is focused to the initial two cases, which are both from healthcare, we also describe the third case to broaden the empirical base our insights stem from.

4.2   Case Studies

At the first case, a German hospital, our observation and interviews took place at the stroke unit, which is specialized on the treatment of emergency patients that recently suffered from a stroke. As the right timing after a stroke is of critical importance, everything is organized around the process of emergency admissions and immediate diagnostics. The stroke unit operates with three to five physicians depending on the shift caring for up to 16 patients. They are supported by four to six nurses; in addition, therapists join the team for initial work on recovery. All professions working on the stroke unit are highly trained and specialized on strokes and other neurological problems. Some of the assistant physicians work on the ward for several months as part of their two year training to become a neurology specialist, others have already passed that exam, but still participate in additional trainings regarding new methods in treatment or diagnostics. Employees of the nursing staff have to complete a special training, too, before they are allowed to take responsibility for patients without supervisors. The group of therapists consists of specialists in therapy of various disabilities that result from strokes like Aphasia or Paralysis. Besides formal training to e.g. learn special skill in treating stroke patients, which are offered by the human resources department in the hospital, there are additional, more informal learning mechanisms within the ward to improve individual work as well as group collaboration. For example, the three professions meet at least once a month in a ward meeting to discuss issues affecting the whole unit and general work processes. Besides that several smaller meetings like daily physician meetings, ward rounds, chief physician rounds or therapists take place in regular intervals. Moreover, staff working in the same shift meets from time to time on hallways or during breaks and discuss cases or problems occurring during work. During these situations, members of staff reflect on aspects such as their cooperation, the organization of the ward and on treatment of patients.

The second case concerns British care homes for people suffering from dementia. Here, care is not organized around emergencies but on daily work routines and sustainable work with residents of the homes to support self-conscious living as long as possible. At a typical care home, five to seven caregivers work with 40 to 50 residents. As the caregivers have no higher education and get just a two-week training one registered nurse per shift is responsible for medical treatments. What differentiates senior caregivers from junior caregivers is the experiences and time spent in the job. This experience is crucial for the job, as the caring for people with dementia is emotionally demanding, as residents may behave unexpectedly and e.g. shout at staff (situations like this are called "challenging behavior" in care homes). Exchanging insights and reflecting on such cases is already recognized as an

important learning mechanism: Caregivers organize what was called in one home "reflective meetings", during which they talk about experiences with residents that were difficult to cope with. In interviews, especially junior caregivers reported that getting feedback and exchanging experiences with more experienced colleagues is a fruitful way to get better in their job. Other occasions of getting together and collaboratively discussing include the shift handovers, in which the nurses and caregivers from overlapping shifts discuss the status of each resident, e.g. whether they showed unusual behavior, and try to find new ways of handling those residents with problems or challenging behavior.

The third case is an IT consulting company in Germany, which focuses on the provision and adaptation of customer relationship management tools for manufacturing companies. In that company our target group are employees from the sales department, who are responsible for customer acquisition and handling the handover from sales to other (development) departments. Learning in the sales department is mostly self-directed and based on experiences from projects and client encounters. They unregularly receive short trainings e.g. about new software features, which are mostly on the web, but according to employees, the main part of learning to improve professional skills is based in practice and self-evaluation as well as evaluation by others. This is also mirrored in regular meetings of the sales department, in which current client activities are described and the participants discuss critical issue in these activities based on their experiences.

4.3   Analysis: Reflection of social practice as an indispensable task

Besides differences stemming from the variation in professions, we observed similarities in all cases. While all organizations offer formal training for their employees, we observed hardly any (official) support for informal collaborative learning based on reflection: In all cases, employees used meetings, breaks or short talks on the hallway to discuss cases, residents or customers with colleagues, to ask for their assistance or to offer insights from their experiences to others. This was especially the case for topics that relate to social interactions with those third parties that could be grouped as "service consumers" (patients, residents and clients in the three cases described).

For example, at the hospital we observed that especially for young physicians talking to relatives was a critical task: They often have to explain difficult medical cases to relatives without a background in medicine and these talks often include conveying bad news like brain injuries patients may never recover from. These interactions are only partly covered in formal educations of physicians. Therefore, getting bad feedback from relatives or finding themselves in unpredicted situations often causes physicians to talk about their experiences to others.

At the care home, we found caregivers to often discuss challenging behavior of patients (e.g. behaving aggressively for no apparent reason) very often. Discussions took place in breaks and meetings with other caregivers. In one meeting, a junior caregiver reported a problem with a woman, who asked when she was allowed to leave the care home several times per day. The caregiver had problems telling her that

this is not possible and reported how this affected him emotionally. Senior caregivers in the meeting then reported from their own experiences what could have caused this behavior and explained how they had dealt with similar situations before. This helped the young caregiver to understand how to deal with such situations and showed him that these problems are not only relevant for him. In the meeting, the participants then also agreed on ways to handle the requests of the respective elderly woman that were supposed to be used by all caregivers dealing with her and similar cases in the future.

Reflection topics around social interaction with third parties were also present at the consulting company. We observed consultants to often discuss habits and behavior of their contact persons at a customer as well as how they performed in recent presentations at certain customers. They even reported that these situations would happen often and that they discuss issues with colleagues e.g. if they had been together at a customer's site. They see the experience from colleagues on how they acted as valuable feedback for improving their abilities and welcome constructive criticism.

It can be seen from the examples that collaborative reflection of social practice is an important and common topic across the various professions we investigated. In all cases we observed people to think and talk about the way they interact with customers or patients. They discussed and compared with colleagues, especially more experienced ones, to improve their skills.

4.4 The process of collaborative reflection and the role of articulation

Besides the identification of topics for reflection, we developed a reference cycle for collaborative reflection, which is shown in Figure 2. The cycle is intended to derive requirements and support the implementation of computer support for collaborative reflection (see [12] for details on the cycle).
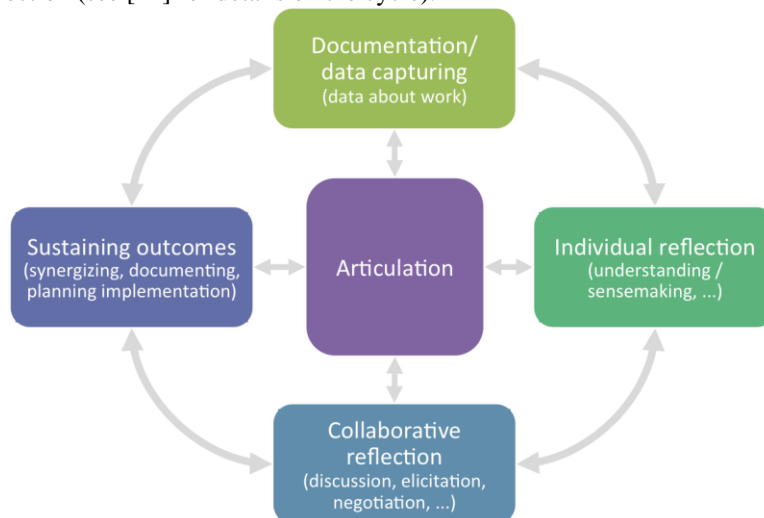

Figure 2 Model of Collaborative Reflection (cf. [12]).

The cycle shown in Figure 2 can be illustrated with an example of reflecting social practice from the cases presented above. In what follows, we chose the reflection of conversations with relatives as explained in case 1 for this. It should be noted that the cycle is not necessary linear, but that steps are interchangeable. For example, individual reflection may happen during documentation, e.g. when a physician thinks about a conversation while documenting it, and there might be multiple loops of collaborative reflection in several groups before outcomes can be documented.

The cycle starts with the activity of **documentation and data capturing**, which in the case of conversations is important to support the individuals participating in the talk to remember the situations and their emotions during it in order to come back to them. This sets the stage for later reflection and also enables individuals to sustainably share experiences from talks with others (as part of their practice to talk about them) and discuss them together when there is time for it.

Individual documentation of conversations is helpful for **individual reflection and** enables physicians to reflect on talks some time afterwards, e.g. after they completed their shift on a stressful day. Similar to offline reflection helpers like diaries, a tool needs to support individuals in going back to past experiences on talks, to remember situations in more detail and to articulate insights stemming from reflection of them.

As observed in the hospital, there is a need to share experiences from conversations and make it available for sessions of **collaborative reflection**. Tools for this need to enable user to share documented talks and to discuss talks that were shared with them. This is helpful especially in work situations where time constraints are otherwise impeding like during the day of physicians. Moreover, in meetings of physicians, the group can come back to shared documentation and results from asynchronous discussion and start a face-to-face reflection session.

For reflection on conversations to lead to improvement, there is a need to support **sustaining outcomes**. The lack of means for this is a major shortcoming in daily reflection practice, as it hinders the benefits of reflection from becoming visible to others and to be implemented. The cycle shows that documented outcomes may then serve as input for further reflections, e.g. when a physician changes her way of conducted conversations and makes experiences on these changes.

As visible in Figure 2, **articulation** is a central activity for collaborative reflection. This can be seen in the example: To start the cycle of reflection, physicians need to document (articulate) the content of talks. Then, they need to articulate their thoughts and perceptions on a conversation as part of individual reflection, as they are otherwise not visible to others. Moreover, for collaborative reflection, they have to articulate their perspectives and thoughts on talk documentation shared with them. To close the cycle, there is a need to express insights taken from collaborative reflection in order to make it sustainable and available for implementation. Therefore, **articulation support** has to be considered a decisive factor in implementing collaborative reflection support.

4.5 Requirements for collaborative reflection support

Besides the importance of articulation derived in the previous session, it is obvious that there is a need for human articulation in reflection of social tasks: These tasks cannot be described (only) by formal criteria and social interactions cannot (only) be learned in formal training. Rather than that, they are subject to informal learning processes, which rely on communication and learning from peers – without articulation, learning is only possible from observation and experiences remain with the individual. Therefore, we regard articulation to be of central importance for the reflection of social interactions as described in this paper.

From the above case studies, we can derive corresponding requirements for articulation support in tools for reflective learning. As a prerequisite for these requirements, we assume that articulation needs to transcend verbal communication in order to become available to a larger audience and for reflection participants to refer to details of articulated experiences. However, noting experiences often problematic due to time pressure and other tasks to be done. For future tool development this implies that:

- **Articulations have to be easy and unobtrusive to make:** Users should be able to document experiences *'on the fly'*, e.g. in a very simple interface that is easy to use or by voice input. Articulation tasks should not cause much additional effort or need a lot of attention. For example, the articulation of emotions during conversations with relatives should be as easy as possible as they are not necessary for work and would thus possibly not be done by medical staff.

- **Articulation tasks have to be integrated into work tasks:** Tools for articulation in reflection should be easily accessible throughout work and be closely related to regular work tasks to lower the burdens of additional tools. In the case of documenting conversations, it should therefore be avoided to cause additional work by requiring physicians to document conversations in the patient's folder and in an additional reflection tool.

- **Articulation of experiences has to be accepted as valuable task:** Since articulation always causes some effort, tools need to show users that outcomes of articulation and collaborative reflection are helpful – not only to the individual that did the articulation task but also to others participating in reflection sessions. For the reflection of conversations, tools need show users that documenting experiences leads to improvements for their conversations sooner or later.

- **People need to be aware of articulated experiences:** For documented experiences to become usable in collaborative reflection, digitally sharing them must result in recipients noticing their availability. This opens up the possibilities for collaboration and mutual commenting. Taking the example of the hospital above it would not be sufficient to add a paper to the patients case folder for documentation of talks because this is only accessible in the patients room.

- **Articulations should be contextualized:** As there might be many articulations created over time and as reflection participants look for experiences and insights suiting their respective case or problem, there is a need to contextualize articulations, e.g. by referring to specific cases or actors that took part in

experiences. In the example of reflecting conversations with relatives, contextualizing could be done by grouping conversations on the same medical disease or with relatives of the same patient.

The requirements above show how articulation as a key mechanism in collaborative reflection support tools can provide support that can be handled and integrated into daily work easily. In what follows, we describe a sample implementation of these requirements.

5 Implementing articulation support for collaborative reflection

Using the example of reflection conversations with relatives in healthcare, below we present a tool built to support articulation and other reflection activities. In addition, we reflect on experiences with implementing the requirements described above.

5.1 The Talk Reflection App – Documenting and Reflecting Relative Talks

In close partnership with the hospital described as one case we designed and tested a tool that implements the collaborative reflection model described above and fulfills the requirements described in section 4.4. The aim of the tool shown in **Fehler! Verweisquelle konnte nicht gefunden werden.** and Figure is to support individual and especially collaborative reflection of conversations physicians have with relatives of patients at the stroke unit.
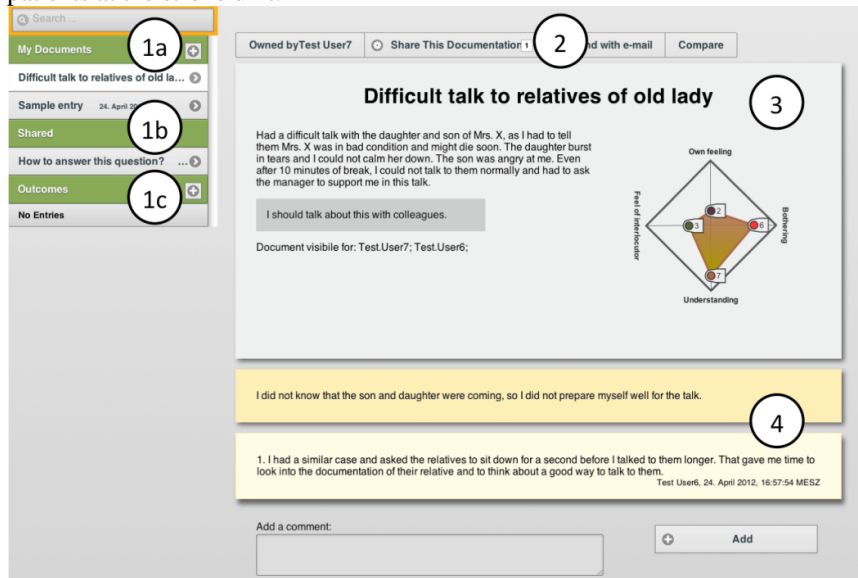

Figure 3 Individual and collaborative reflection spaces: Each documentation can be viewed, shared and discussed. Assessments displayed in spider graphs for a quick overview.

The basic idea is that physicians working on the ward document conversations they had and open them up to discussion with other physicians. It is already mandatory for all physicians to document conversations they had in the patient's folder by hand and sometimes also separately on a computer to inform physicians in later shift which therapy was agreed on or which measure to take in case of emergencies. To simplify the documentation process the application we developed is designed for mobile devices like smartphones and tablets.

The documentations are shown on the right side of the screenshot. On the left you can see lists of documentations done by the users itself (1a) by others users that shared the documentation (1b) and documented outcomes of collaborative reflection (1c). The sharing of documents and a list of users that have access to the currently visible document is shown at (2). The only additional efforts physicians have to take is to make short self-assessments and answer questions about how they felt during the conversation or what they think how the conversation partner felt during their talk. These self-assessments are visible only for the person documenting and are afterwards visualized (3) to make simple comparisons between documented conversations and support remembrance. Least at (4) you can see the space for comments and notes. Here annotations and comments of other users are displayed that can be used to report on similar experiences or discuss want went well or wrong in the case documented above.

Figure 4: Outcomes of collaborative reflection sessions can be saved and related to cases

To support the sustainment of outcomes of reflections we developed a page to overview the list of documentations (Figure). Here users that did individual reflection or participated in a synchronous or asynchronous reflection session can select on or more cases that they reflected on (3) and document explicit outcomes e.g. changes in procedures or good practice. Outcomes are divided into a short descriptive title (2) and a more detailed description of the outcome that highlights the commonalities of

the cases selected (1). Afterwards these documented outcomes are shared among users of the app.

5.2   Implementing articulation requirements: Insights from design

We conducted two workshops with physicians of the hospital. They were planned and carried out as part of a formative evaluation to prepare a broad roll out in the hospital ward. The first workshop with three physicians was focused on utility and applicability of the app. I the second workshop another four physicians tested and evaluated a second prototype to test-drive the rollout in the ward.

Referring to the requirements described in section 4.5 we received valuable feedback. In general users agreed that the application is **easy to use** and they had fun making documentations with the simple, mobile interface. Nevertheless they had several suggestions for usability improvements like a larger input fields for personal comments and ideas for a more intuitive naming of certain categories. They also discussed a lot about problems with auto-correction of medical terms by the mobile OS and issues with syncing the content of the app with the server resulting from the poor WIFI connection. The fact that all these issues came up during the discussion shows the importance of this requirements and the need to improve user interfaces and input methods to make them less obtrusive.

During our workshops we also discussed better ways to **integrate the app into daily work**. As shown in Figure 3 we already implemented a button to export documentations by e-mail, which allowed them to copy & paste the documentations into the HIS, but due to the connection issues this did not work out very well. Unfortunately a smoother integration with automatic synchronization, which would be most comfortable, is not possible due to constraints of the IT department and high development costs for program interfaces of the proprietary HIS. Therefore participants proposed to give up the benefits of the mobile device and start using the app on the desktop PC as well where they can easily import and export information from on. This decreases possibilities to document cases outside the physician's office but they also reported that they used this option not as often as thought upfront.

We also stated that the **articulation of experiences has to be accepted as a valuable task**. During the workshop we observed participants heavily referring to what they wrote when explaining the cases again and using the documentations as additional information to more blurry memories. We also received multiple feedbacks that the app and discussions itself resulted in a **higher awareness** for the topic of conversations with patients and relatives. On user requests we also added a checkbox that says "I want to talk about this later" to raise awareness for certain cases which participants would regard as unusual or more important. There were also ideas for additional organizational support by introducing a bi-weekly meeting in which assistant physicians could talk about documentations they did face to face in addition to sharing them digitally.

The first feature to support **contextualization of articulation** we integrated was the self-assessment form. These short questions were regarded as helpful for quick assessments and during the workshops we agreed on questions that would better fit

the circumstances like "How likely is it that I will think about this at home". In line with the model they asked for the ability to document cases more detailed e.g. to be able to select from a list of topics like "therapy", "diagnostic" or "information". They argued that this would help to find similar cases more easily.

While the workshops were conducted in a formative approach they showed that the application and the underlying process and requirements are applicable to support collaborative reflection of social practice at the healthcare workplace. The participants had numerous ideas and scenarios how the app could be improved to fit better in their workplace settings and already used it in the workshops to document, share and discuss cases of conversations they had and wanted to reflect about.

6 Conclusion and further work

In this paper we described the importance of collaborative reflection for learning at work. We focused on reflection as a mechanism for informal learning within groups sharing their experiences. Those are especially relevant for learning for topics like social practice that cannot be learned from articulated knowledge but is a result of a continuous process of comparing own behavior to that of others. From two case studies in healthcare and consulting businesses we identified conversations with customers and patients to be a reoccurring topic in collaborative reflection. As an example we took reflection at a hospital about conversations with relatives and developed two prototypes that where tested with groups of physicians on their applicability to support reflective learning about this topic.

The requirements that were elicited during the case studies proved to be supportive for tools use. We designed the tool to integrate into daily work as articulation is already part of it. That notes are digitally shareable and less dependent on the paper based patients folder was very much appreciated. In addition the fact that the availability of the app raised awareness for the topic itself and fostered discussions not only in workshops but also off the record e.g. in breaks or spontaneous meetings.

Nevertheless there are improvements to make in the ways physicians can use the app as due to technical restrictions and missing wireless connections it was too difficult to use the app since they had to go to a special room to synchronize data. In addition further work has to be done to simplify technical integration between official documentation and the Talk Reflection App to reduce double work as it sometimes took place during the tests. But as the tests brought promising results and positive feedback we will adapt the process and apps to other domains.

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