Support for Collaborative Reflection in Healthcare: Comparing two Workplaces

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Abstract. Reflection is a frequent and integral part of daily work, and often it is done by multiple actors in meetings or during joint work. Its support, however, has mainly been investigated with respect to educational settings or individual reflection processes. This paper describes a framework for the support of collaborative reflection at work and a study on its implementation at two workplaces in healthcare. Results of the study show which means of supporting collaborative reflection can be beneficial in practice and that we need to understand this support as a socio-technical task.

1   Introduction: Collaborative Reflection at Work

Reflection is a frequent and integral part of daily work (Boud 1985; Kolb and Fry 1975). Typical examples are thinking about whether certain decisions were right and groups considering whether their cooperation is effective. Reflection processes contain three steps: Going back to experiences, re-evaluating them and drawing conclusions for future work from this (Prilla et al. 2012a). While this has been investigated for *individuals* reflecting, *collaborative reflection* is done by a *group of people* sharing their experiences and jointly developing changes for future work from that (Daudelin 1996; Dyke 2006). The result of such collaborative processes can be relevant for individual work, but also on group and organisational levels. By this, collaborative reflection complements education and vocational training at work with a process of bottom-up understanding and evaluating work and helps people to learn from experiences in a self-directed, collective manner (Daudelin 1996; Hoyrup 2004). However, there are hardly any insights on the design of tools for collaborative reflection.

This papers aims to bridge the resulting gap and describes a study in which support for collaborative reflection was trialled in two healthcare workplaces. From this, the paper shows how collaborative reflection can be supported, that we have to understand this support as a socio-technical task and that there is a need for further work on exploring such support.

In what follows, we describe existing work and insights into collaborative reflection as well as the "Talk Reflection App" as a means to support such reflection (section 2). After that, we present the study conducted in the healthcare workplaces (section 3), its results (section 4) and a discussion on conclusions to take from our work, including impacts on the design of collaborative reflection tools (section 5).

2   Computer Supported Collaborative Reflection

2.1   A Framework for Supporting Collaborative Reflection

Tools for the support of reflection have been discussed mainly in educational settings or with respect to individual reflection. Authors have proposed journals or portfolios or series of pictures to help users to reconstruct and reflect experiences (Fleck and Fitzpatrick 2009; Scott 2010). With the exception of support for specific situations such as post-mortem project reflection meetings (Kerth 2001) and generic tools such as shared whiteboards (Lin et al. 1999) there is hardly any support for collaborative reflection available.

   Differences between individual and collaborative reflection can foremost be seen in support for communication among participants and sustaining results – to reflect together, participants need to exchange experiences, different individual perspectives and understandings need to be discussed and solutions need to be agreed on. To operationalize the respective steps of collaborative reflection and the corresponding needs, we created a cyclic blueprint for collaborative reflection tools based on insights from earlier user studies on collaborative reflection (Prilla et al., 2012a; **Fig. 1**).
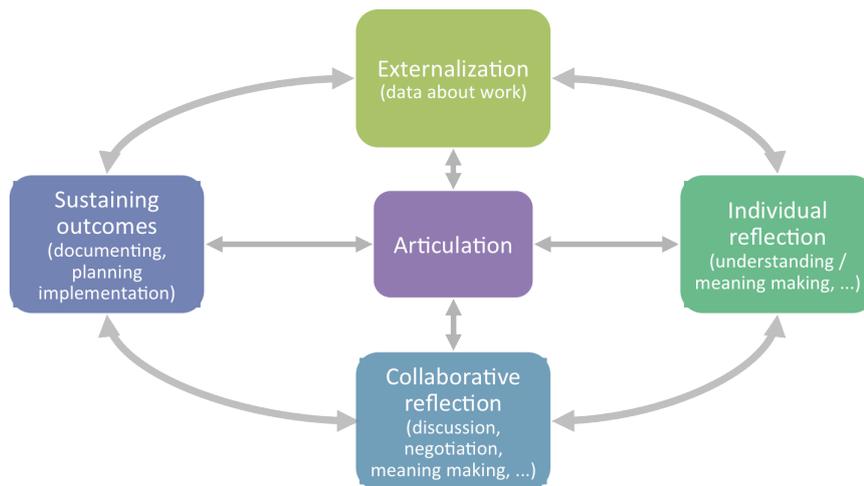
Fig. 1. Cyclic blueprint of collaborative reflection, based on (Prilla et al. 2012a).

   The blueprint shows how collaborative reflection is tightly coupled to phases of individual reflection and that these phases constantly switch, e.g. if a topic is discussed in a group, then reflected by individuals with respect to own experiences and later on again reflected within a group. Such reflection needs a sustainable documentation of experiences to share them with others and to sustain all relevant aspects – usually, after a certain time details may be forgotten and emotions may fade, which affects the reflection processes afterwards. Moreover, reflection should end up in sustainable and shareable results if it is to lead to changes in work – otherwise, only the group reflecting knows about proposed changes ad their origin (Prilla et al. 2012b). A central requirement for al steps is support for articulation of experiences, ideas,

solution proposal and results and to be able to share these articulations. **Table 1** summarizes the resulting requirements (cf. Prilla et al. 2012a).

Table 1. Requirements for the support of articulation in collaborative reflection.

Articulation	Requirement
Experiences	Documenting experiences for later use
Individual Reflection	Documenting and sharing insights (e.g., in comments)
Collaborative Reflection	Sharing similar experiences and ideas for solutions (e.g., in comments)
Results	Documentation and sharing of results

2.2 Supporting Collaborative Reflection of Conversations: The TalkReflection App

The „Talk Reflection App" (**Fig. 2**) was developed to support the phases of the collaborative reflection blueprint shown in **Fig. 1** and to implement the requirements documented in **Table 1**. The app supports reflection on conversations with patients in hospitals, residents in care homes, relatives of patients and third parties such as social workers, as our studies in healthcare workplaces revealed that this is a relevant and reflection intensive topic (see Prilla et al. 2012a). Therefore the app supports articulation to explicate experiences from conversations as described in **Table 1**. It also supports sharing these documentations and the articulation of outcomes from collaborative reflection. The usage of the app is explained in the following scenario.
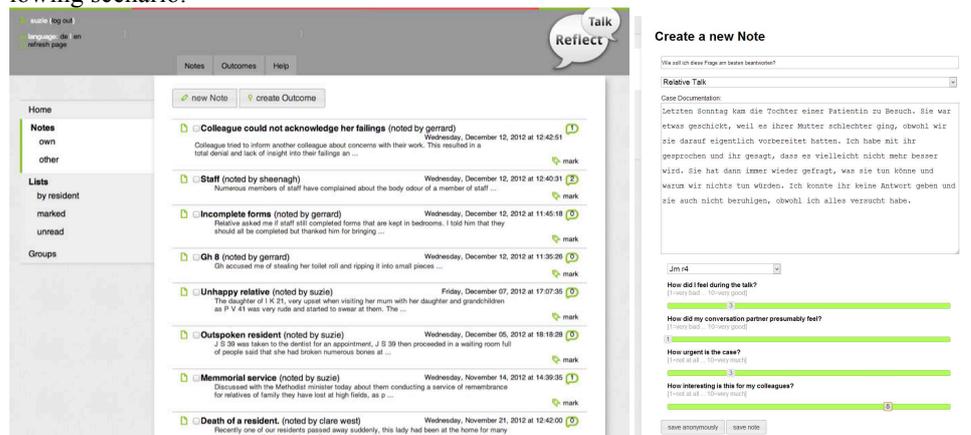
Fig. 2. The Talk Reflection App. Left: Overview of accessible, articulated experiences (documentations); Right: Form for documenting a conversation.

The caregiver Anna has had a difficult conversation with relatives of a resident in the care home she is working hat. Afterwards she *documents* (articulates) the content and topic of the conversation together with her feelings during the conversation in the app. She describes her insecurity when telling the son of an older lady that the lady's medical conditions are getting worse dramatically, and she might die soon. She uses the content fields to describe this and

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the self-assessment sliders below it to document her feelings about the situations (see **Fig. 2**, right).

Her colleague Bernd notices that Anna has shared her note with him (**Fig. 2**, left). When he reads it, he remembers a similar situation he has been in and comments on Anna's documentation, suggesting to refocus the conversation on the relative and to offer him support – in other words, he reflects on his own experience and makes a suggestions for coping with a comparable situation in the future. Since the topic is of interest for the rest of the ward, too, Anna's case is also discussed in a meeting with all caregivers of the ward and together they discuss strategies how to support and teach new caregivers in similar situations. They agree on three things to include in this process and document this outcome of their collaborative reflection in the Talk Reflection App, connecting it to the cases it is related to. They shared it with all colleagues on the ward in order to enable them to reconstruct the suggested solution based on the cases linked to it.

3 Supporting Collaborative Reflection with the Talk Reflection App: A Study at two Workplaces

The Talk Reflection App was trialled for four weeks in a German hospital specialized in care for neurological diseases (case 1) and for five weeks in a British care home for people suffering from dementia (case 2).

In case 1, reflection was focused on conversations between physicians and relatives of patients, as physicians felt they needed to systematically use experiences from such conversations to learn how to act professionally if the conversations get emotionally stressful. They stated that their prior education had not covered this topic and that they would be willing to form a group helping each other in it by using the Talk Reflection App. The study was conducted with five participants, including inexperienced assistant physicians, who had just started work at the hospital and more experienced senior physicians (see **Table 2**).

Table 2. Overview of study participants and tools used to gather data

	Participants	**Data from studies**
Case 1 (Hospital)	5 physicians (2 experienced, 3 less experienced)	Questionnaires (Pre/Post), interviews, observations (meetings), log files
Case 2 (Care home)	5 caregivers (3 to 20 years of experience), (1 manager)	

In case 2, the caregivers wanted to reflect on conversations and interactions with others related to such conversations, including encounters with residents, their relatives and third parties such as social workers. Care for people suffering from dementia is especially demanding for caregivers, as these people might (re)act strangely or even become aggressive. Being able to talk to them, their relatives and third parties in a professional way not only diminishes the personal stress level resulting from that, but also improves the reputation of a care home. The study was conducted with five caregivers, who used the Talk Reflection App to learn about

these situations, and the manager, who wanted to be informed about it, but did not actively use the app.

In both cases, the app was introduced to the five participants in a common workshop in order to enable them to work with it in a self-directed manner. Before the workshop, they were asked to fill out a short (pre-) questionnaire (10 items) to create a baseline on their current reflection practice and need for learning about the respective topics. In the middle of the trial period and at its end, we conducted reflection workshops with the participants, in which they were asked to skim through experiences documented in the app and choose some for reflection in the workshop. During the meetings a researcher was present to observe and document reflection among the participants and to get feedback on the app.

Table 3. Meetings during the trial periods in both cases.

Time	Meeting and Tools for data gathering	
Begin of trial period	Introduction and training, pre-questionnaire	Observation
Middle of trial period	Initial reflection meeting on cases in the app	
End of trial period	Final reflection meeting, post-questionnaire, short interviews	

At the end of the trial period, in addition to the final reflection meeting the participants were asked to fill out a post-questionnaire (30 items), which included the same items used to create the baseline and an additional set of items on aspects such as acceptance, value and impact of using the app, which were aligned to the levels of evaluation on the model of Kirkpatrick (1975) – typical questions can be found in section 4. Moreover, the participants were interviewed briefly on their experiences in using the app. **Table 3** summarizes the course of the studies and the tools used for gathering data. This data was complemented by the log data captured throughout the usage of the app.

4   Results

In both cases, the participants used the Talk Reflection App for the documentation of critical conversations and (in case 2) interactions in order to reflection on them later. In case 1, for example, an assistant physician documented a conversation with relatives, which she perceived to be very demanding (see **Table 4**). She created a comment to document this perception. In a later meeting with the other participants, she used this documentation as a memory aid to present this case to her colleagues in a very detailed manner. This caused immediate reactions by her colleagues and in the resulting reflection session of this case, colleagues reported similar cases and proposed different ideas how to better deal with such situations. In the end, they agreed that in these situations, inexperienced physicians should always ask a senior physicians to join until they were confident to deal with such situations alone.

In case 2, caregivers reflected about the death of a resident, who has been admitted to hospital against her advice to the relatives and social workers. One of the caregivers had documented the interaction with the relatives that led to the admittance (see **Table 4**), and

afterwards used this documentation to reflect on this it with her colleagues and the home manager. Some senior staff members reported on similar situations in the past and that a conversation how to deal with the emotional affection directly after the situation had helped them to overcome their grief. Although some had stated initially that such situations can happen in a care home and that the group should not take any particular measures, after the reflection session they agreed that there would be a possibility to have such group conversations after very demanding situations in the future, which would be led by the manager.

Table 4. Sample Documentation, Comments and Outcomes of using the Talk Reflection App in both cases.

Articulation	Hospital (Case 1)	Care home (Case 2)
Talk / Interaction	"[Patient's] therapy finished. Again relapse, palliative therapy. Prepared [relatives] for begin of home care, asked to seek professional support for care. Talk was very difficult, parts were not received or blocked out."	„The resident passed away suddenly, had been here long, was liked by all staff. Was ill in the morning and her guardian admitted her to hospital, Unfortunately she passed away [there]. This was very distressing to the staff as they felt it would have been more dignified for the client to be in familiar surrounding."
Comment	"[Relative] conveys the feeling it is our fault. (…) Hears for the first time that [patient] is going to die"	- (verbal statements)
Outcome	"Problem: Conversation held alone. It should be known that a senior physician can be asked for support"	„After discussing with the homes manager about the staff being upset, it was decided that staff who were most affected get together and discuss thoughts and feelings."

The examples shown in **Table 4** illustrate that besides documenting experiences and making them accessible later, using the Talk Reflection App also had an impact on the reflection of each individual: In the articulation work (cf. Suchman 1996) of documenting their experiences, the participants had also documented insights from reflection. In case 1, the physician mentioned that she perceived that the relative had blocked out certain information given to her, and in case 2, the caregiver (verbally, not in the app) stated that the grief of staff was mainly caused by the manager, relatives and social workers not listening to their advice. This shows how documenting the cases already triggered reflection.

Looking at the usage of the app in both cases (see **Table 5**), we can see that is was predominately used for the documentation of cases. Given that a critical situation does not appear every day, we consider the creation of 7 documentations in 12[1] days (case 1) and 18

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[1] Due to technical problems, there is only solid data for the last 12 days of the trial period, although the participants stated to have used the app before as well. In addition, some physicians created docu-

documentations in 33 days (case 2) to be sufficient for an initial test, in which in both cases the users needed some time to adopt the application and integrate it into their work tasks. All documented experiences were shared with all other participants in both cases.

Despite the sufficient amount of documentations, other features such as commenting and creating outcomes were used below our expectations (see **Table 5**): Compared to the amount of documentations, the number of outcomes (three in case 1, two in case 2) and the number of comments (nine in case 1 and 14 in case 2) are not sufficient and, especially in the case of comments, cannot lead to fruitful exchange of experience as it is necessary collaborative reflection. In addition, some of the created outcomes in the app are a result of reminding the participants during reflection meetings to also write down their outcomes.

Table 5. Number of Documents, Outcomes and Comments created in the Talk Reflection App in both cases.

Type of articulation	Case 1	Case 2
Documentation of critical conversations / interactions	7	18
Documentation of outcomes from reflection	3	2
Comments on (own / others') documentations	9 (4/5)	14 (11/3)

Despite the numbers shown in **Table 5**, an analysis of statements and feedback given by the participants of both studies during the meetings and in the final interviews shows that they perceived using the app to be valuable for exchanging experiences, reflection on them in the group and deriving outcomes for future work. In meetings, we could observe participants vividly discussing during reflection how certain situations needed to be understood or could be tackled better in the future. In interviews, participants could easily describe comments they had made verbally on others' documents and also some agreements the participants had come up with to solve certain issues expressed in the documentation. The participants reported that all of these articulations and communications had happened outside the app in face to face interactions as they happen daily in hospitals and care homes when people meet each other during work, in meetings or between shifts. These casual interactions were perceived to cause less effort and led to features such as commenting being used less. This effect could also be seen in meetings, in which participants used documented experiences from the app to describe a certain situation to their colleagues and to reflect on it verbally afterwards.

Data from the questionnaires used in the study underpins that there was value from using the Talk Reflection App in both cases, as it indicates that participants perceived it to have a positive impact on constructively thinking about conversations (that is, individual reflecting on them) and discussing conversations with colleagues (part of collaboratively reflecting them, see **Fig. 3**). The data also indicates a light effect on the perception of how situations reflected on could be improved during the trials, which was slightly stronger for case 2. Given that the trials only lasted four and five weeks, this goes beyond our expectations as we had expected changes in behaviour to take longer than this period to be implemented. However, long-term evaluations need to approve this finding.

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mentations offline and wanted to save them to the app, although they had no connection to the Internet. This resulted in lost cases.
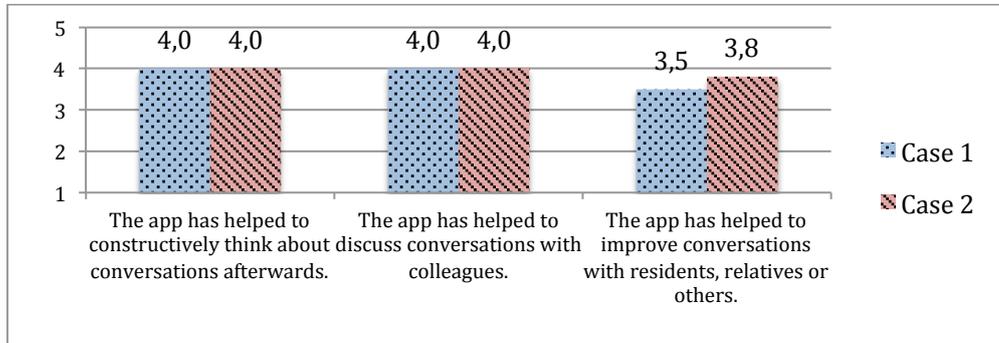
Fig. 3. Perceived value of using the Talk Reflection App in both cases, n=5 for both cases.

The participants were also asked to clarify which factors had influenced their reflection practice. Answers to this show that being aware of reflection as an important topic and organisationally anchoring it in regular meetings was perceived at least to be as important as using the app (see **Fig. 4**). For case 1, the answers even indicate that the participants perceived the app to be less valuable for reflection that the other factors. These surprising results can be attributed to the fact that the studies lasted for only four and five weeks and that in this short period time, the effect of the intervention to more systematically reflect superseded the positive effect caused by the app. This might have been amplified by the time to adopt the app in each of the cases as reported above. On the other hand it shows that the sheer process of introducing the app acted as a reification of reflection, increasing awareness for it – this provides a good basis for long-term success of the app.
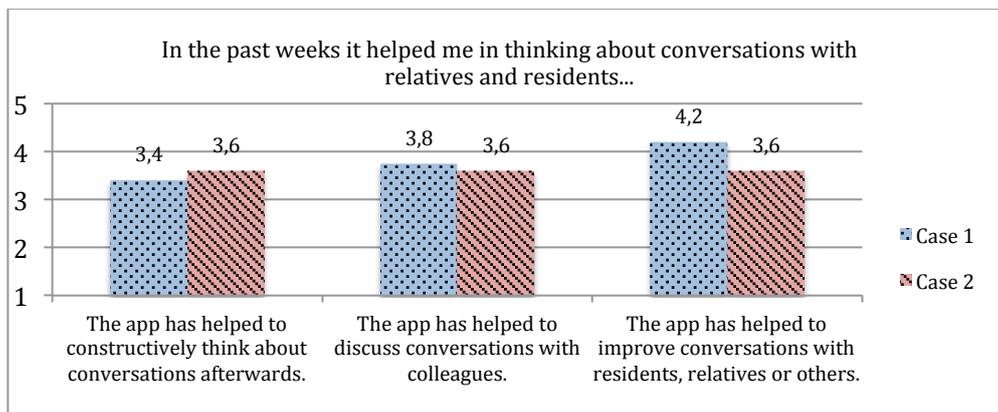
Fig. 4. Factors impacting the reflection practice of participants in both trials.

Although our observations and insights cannot be generalized, as the data from the trials was collected with low participants numbers, they point to the value potentially created by tools such as the Talk Reflection App that support the collaborative reflection blueprint

shown in **Fig. 1**. Further work will have to show whether these positive pointers also show in other cases with more users and a longer period of usage.

5   Discussion: Reflection as a Socio-Technical Task

Results of the study show different perceived value and adoption of articulation support for conversation and interaction experiences, comments and outcomes as described in the framework in section 2.1: While the documentation of experiences and the possibilities to share them with others was used quite frequently, the discussion of experiences and creation of outcomes was observed to take place outside the app (but, sometimes, by using it to refer to its content). This is also indicated by the questionnaire about reflection support (**Fig. 4**). The results thus suggest that, with regard to support collaborative reflection, the Talk Reflection app was mostly used as a tool to *prepare* (by documenting and sharing cases), to *mediate* (initial reflection within the documentations) and to *trigger* (discussion within the group) reflection. To support communication and articulation about experiences and the documentation of outcomes from reflection, further work needs to be done. From these findings, we derived a classification of reflection support as primary and secondary effects happening in technical and social processes (**Table 6**).

Table 6. Primary and secondary support of collaborative reflection steps. Insights derived from the studies and separated by technical (T) and social (S) parts of socio-technical support.

Purpose of Articulation	Primary Support	Secondary Support
Documentation of experiences	Documentation in app (T)	Verbal explanation (S)
Individual reflection	Reflective parts in documentation (S and T)	
Collaborative reflection	Direct communication (S)	Comments in app (T)
Sustaining outcomes	Direct Communication (S)	Documented results (T)

Our observations indicate that supporting collaborative reflection is a **socio-technical design task**: In both cases positive effects on the reflection process where the result of a combination of social processes with technological components. This explicitly includes that technical support for reflection needs to be complemented by establishing organizational processes.

   Although collaborative reflection was conducted successfully in direct communication between participants, there are also trade-offs to be considered: It is necessary to leave and share traces of experience exchange and reflection outcomes for those that did not participate in the reflection process personally. However, during the study participants needed to be reminded to create comments in the app or to document an outcome. The sufficient number of documentations also shows that this problem is not caused by the effort it takes to document a difficult conversation. On the contrary, we conclude that users have to be triggered to also use the app for other kinds of communication. "Prompting" (e.g., Lin & Lehman 1999), that remembers users of other content and features of a tool, may be helpful for that (e.g. by

showing questions like "Have you been in a similar situation?"). This has to be analyzed in future studies with the Talk Reflection app.

One limiting factor of the study is that the tests were conducted in participant groups working closely together. Physicians in case 1 and caregivers in case 2 communicate regularly as they mostly work on the same wards and floors. Therefore using the comments within the app to exchange experiences may be less beneficial and more time-consuming for them than just talking about it on the hallway during daily work. Future studies have to shed light on the question whether groups that do not work together so closely (e.g. different wards of the same care home or hospital) would use those functions more often.

6 Conclusion and Outlook

This paper describes a study about support for collaborative reflection at two healthcare workplaces. For the study the "Talk Reflection App" was used that was developed based on empirical results and a model of collaborative reflection. Analyzing the results of the study, we suggest that this support has to be understood and implemented as a socio-technical system rather than a development challenge. We found that in the studies the documentation and sharing of situations to reflect about turned out to be a crucial preparation task and trigger for reflection, while comments as part of collaborative reflection and development of outcomes where observed to take place mostly in direct communication between participants.

Future studies have to show whether and how these later phases of collaborative reflection can also be supported. Prompting mechanisms as described above and other concepts are currently tested and evaluated.

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