Reflective TEL: Augmenting Learning Tools with Reflection Support

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Abstract. Reflection and collaborative reflection are common means for learning at work. Based on four studies on tool supported collaborative reflection, which created insights on barriers and opportunities for such support, we describe a concept of augmenting tools with reflection and a prototype showing how the concept can be implemented in typical TEL environments.

Keywords: reflection, collaborative reflection, plugin reflection

1   Introduction

Reflection can be understood as returning to experiences, re-assessing them and deriving insights for future behavior [1]. Reflection occurs "when our existing conceptual schema do not apply (or do not apply well) and thus we need to reschematize nature in order to come to a (better) understanding of it." [2] and is necessary in modern workplaces [3]. It has a social dimension, as workers often exchange experiences and try to learn from it together. Such *collaborative reflection* can create results transcending results of individuals [4]. Collaborative reflection has been neglected in past research and most work is on individual reflection [5], but recent work has taken it up [2]. Concepts for applying collaborative reflection in practice, however, are missing.
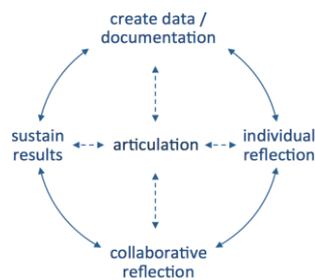

Fig. 1. Model of collaborative reflection introduced by Prilla et al. in [7], adapted in [8].

Support for collaborative reflection needs an understanding of how reflective practice can be supported, that is, which tasks need to be supported and how. We created [5, 7, 8] a model of collaborative reflection, which we used for the design of reflection support (see **Fig. 1**). The three basic steps in the model are *creating data and documenting experience* to reflect upon, *reflection on experiences* and *sustaining results*

from reflection. Reflection includes *individual and collaborative reflection*, as each situation of collaborative reflection also contains individual reflection.

Baumer [2] has suggested three dimensions of "reflective informatics", which resonate with our model. These include *breakdowns* (situations in which the reality diverges from expectations), *inquiry* (people critically examine their experiences), and *transformation* (results from reflection are put into practice).

While the work described above provides information on *what* to support in collaborative reflection, the problem remains *how* to support it. Following we analyze outcomes from studies on tool supported collaborative reflection to frame a concept.

2 Supporting Collaborative Reflection in Practice: A Study

Using the model shown in **Fig. 1** we created the "TalkReflect App" to support reflection on social interaction at work [7]. It supports users in reporting experiences by creating notes, sharing these notes and reflecting on them by creating comments that contain similar experiences, viewpoints and ideas for learning from the discussion.

The TalkReflect App was used in four studies in different workplaces with different constraints: a *care home*, a *hospital*, a *group of interns* in public administration and a *department* in the same organization. The studies were run for 50-80 days and with user groups of 6-18 users and gave us insights on the usage of the tool [8, 9]:

- **Spatial arrangement of user group (co-located vs. remote):** For users working in different locations the app provided value as a new channel enabling exchange. This was different when users were co-located, as in the hospital and care home.
- **Support by a facilitator:** Users used the app more often if others encouraged participation or asked for comments. However this does not scale for large groups.
- **Duration of app usage:** In all studies activity started slowly, reached its peak after the slow start and decreased shortly after. This suggests that the effects caused by the tool were short to mid-term only, even if there was a facilitator present.

A content analysis [9] shows that in the interns and public administration cases the tool was used (as intended) for sharing experiences, reflecting on them and creating learning outcomes. In the other two cases it was used only for sharing experiences and (in the hospital case) for seeking guidance from a superior (the facilitator of the group). We attribute these differences to the location (see above) and facilitator activities – the facilitator in the hospital case provided advice rather than supporting reflection [9]. Based on correlations and cross tables we also found three types of articulations likely to positively influence the creation of outcomes in a thread:

- **Mentioning emotions:** Some participants explicitly described that they were (un)happy with certain situations they shared with others, e.g. "Was not fun man".
- **Asking questions triggering reflection** such as "what do people think about …".
- **Exchanging experiences**: Participants often pointed to similar experiences or even included descriptions of them, e.g. "I have been through similar situations. I (…)".

Regression analysis was used for further investigation. We found an effect of exchanging experiences on the number of results being documented ($R^2=0.515$, $F=37.2$, Sig.$<=0.01$), while questions and emotions had minor effects on this. Therefore we conclude that actively supporting experience exchange may foster the results documented in tools, and that using questions or emotions may provide additional support.

3 Augmenting Tools to support Collaborative Reflection

Our studies suggest that two aspects may enable successful reflection support:

- Activity decline and low usage happened mostly in co-located groups and when it was used as a short-term intervention. We thus suggest *embedding reflection into existing or wider communication contexts* to enable long term usage**.**
- Facilitator support was helpful for tool usage and we found that certain articulations led to more outcomes being documented. Therefore we suggest that reflection and supportive articulations should be *supported actively by facilitation*.

These aspects can be supported if systems already used in organizations are augmented with reflection features. This includes (but is not limited to) the following features:

- **Prompting users:** Providing *prompts* (e.g. questions and instructions) to users can support them in contributing to collaborative reflection [8, 10, 11]. Adding reflective prompts to communication tools such as forums (e.g., asking users to share experiences) encourages reflective articulations. This also scales for large groups.
- **Asking questions in conversations:** A system can provide users with *support for actively asking others for support* such as choosing from a list of helpful questions.
- **Connecting users:** A tool can provide users with suggestions of other users, who share similar experiences or are interest in similar topics, to support cases in which reflection between people who could not reflect in face-to-face situations regularly.

Fig. 2. Snippet from our community of practice platform augmented by reflection features.

As part of a large project we are developing a prototype of a community of practice augmented by reflection features. As an example for the features mentioned above **Fig. 2** shows that the prototype uses prompts (no. 1 in **Fig. 2**) and questions to be chosen by the user (no. 2) to encourage commenting on a shared experience (top). This transforms a common feature (threaded discussions) into a reflective feature.

4 Conclusion and Outlook

We have suggested the concept of *augmenting existing communication and learning tools with features supporting reflection* to implement collaborative reflection in practice. Our work adds to the community by describing a conceptual and technical approach for the implementation of reflective learning at work. We are aware of the fact that there might be other concepts, but we are convinced that ours is a good way to go forward with development and research on reflective learning. In further work we will evaluate the prototype in real workplace scenarios to explore the concept further, asking questions such as how augmented reflection features change the use of tools and how much reflective content is created as opposed to no reflection support.

Acknowledgements

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