

# Reflecting on Emotion: Design Challenges for Cooperation Technology

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**Abstract.** There is a current interest in capturing and using affective data in work and learning. In this paper we argue that cooperation technology supporting reflective learning in the workplace needs to go beyond the focus on emotion as a *state* and direct focus to emotion as part of a *social process*. We propose to focus on *emotion regulation*, stressing the active role of the learner in making sense of and acting upon emotions. We outline a set of related challenges for collaboration technology.

## 1 Emotion and emotion regulation in reflective learning

Emotion is a key element of human experience enabling people to make sense of their situation and choose appropriate actions [1]. In the workplace, emotion influences work performance in various ways, for example promoting or hindering creativity. The importance of emotion for technology supported work and learning has lately been recognized in TEL [2] and CSCW [3].

The addressing of emotional aspects of work and learning with technology tends to focus on the capturing and representation of emotion considered as a state from which appropriate action can be derived.

We rather suggest the need to focus on the *social processes* through which participants actively interpret, act upon, and manage the emotions of self and others [4]. In particular, we focus on *emotion regulation* [5] as the basic process whereby people seek to redirect the spontaneous flow of their emotions. For example: people engage in emotion work as part of coping with work situations [6], controlling what emotions they display and conceal; Emotion influences social judgments made by individuals and groups [7]; People use cues from similar others in emotional comparison to make sense of ambiguous situations and identify their own emotional state [8].

In our research we focus on reflective learning, i.e. learning based on rethinking work experiences [9] and we take the perspective that work and reflection are intertwined through a reflective learning cycle [10]. Emotion regulation plays a role throughout this cycle in various ways as illustrated in Figure 1. For a complete discussion of the model and grounding in relevant literature, we refer to [11]. In this position paper we discuss implications for design of cooperation technology in light of the role of emotion in work and reflection on work.

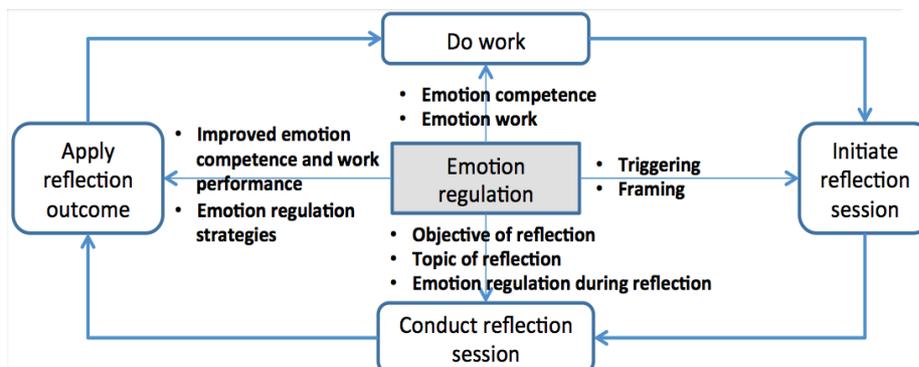


Figure 1: The role of emotion regulation in the reflective learning cycle [11]

## 2 Challenges for cooperation technology

**Doing work** - To support reflective learning, technology needs to capture data to help people reconstruct and make sense of work experiences worth learning from. Given the importance of emotion in work processes, data about it is critical. A challenge for technology is to capture not only emotional states during work, but also data to make sense of, and make use of, the social processes around emotion. Automatic collection of e.g. sensor data may produce data that are hard to interpret in this regard. It may be necessary to include people's own assessment of emotions. Characterizing an emotion in close connection to the work in which it occurred helps the person make sense of the event in addition to generating data for later reflection. This may also include reporting on the (perceived) feelings of others, as e.g. in [12]. Reporting emotions during work also becomes a part of managing emotions: Categorizing an emotion can make it possible to constructively act upon it.

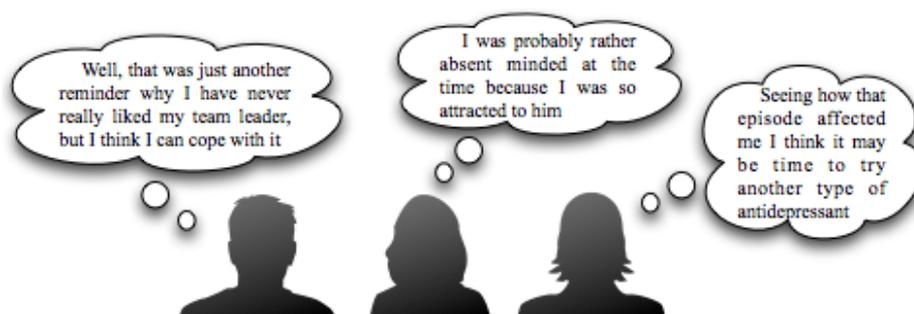
What emotion-related data to collect and how useful it will be as a source of learning depends on the expected type of reflection. Thus it is a challenge for technology to capture the type of data that fits the reflection sessions in which the data will be used. For example, if it is known that the reflection will involve the workers who shared the work experience, it may be that less data is needed because participants' combined memories and the social process that takes place *in the reflection session* provide useful context data for making sense of the work experience.

**Initiating reflection** - The triggering of reflection has an emotional component: people want to get out of the negative emotional state associated with discrepancies and situations that need to be sorted out. Thus, when using technology to help trigger reflection on collaborative work one may deliberately highlight aspects likely to lead to negative emotion. A related challenge for technology is to help people establish a frame for reflection on emotional aspects of work that relates to emotion in a way considered constructive and attainable by the participants. For instance, regarding work experiences heavily including emotion work: Should the emotion work itself be made a topic, and/or improvement of emotional competence be an explicit objective,

or is it better to have a more work task directed reflection objective and let reflection on emotional aspects follow as a side-effect?

**Conducting a reflection session** - Reconstructing and making sense of work experience is an affective and social process. The emotions involved in the episode(s) reflected on might help the participants understand the work experience better but also represents a challenge to the reflection session (e.g. negative emotions making it difficult to create solutions or make decisions) [9]. During reflection, participants should be supported in the exploration *and management* of their emotions. This means being in control of sharing, but also getting awareness of emotion-related issues worth reflecting on.

To share or not to share is a key question in collaborative reflection sessions. Sharing experiences and insights can help in e.g., collaborative construction of knowledge useful to the collaborative work. However, for privacy reasons and/or because it might create more trouble than benefit to the continued collaboration, not everything should be shared (see Fig.2 for examples of things it could be problematic to share).



**Figure 2: Not all reflection on emotion is fit for sharing with others**

On the other hand, reformulating experiences might make them socially acceptable: “I know I was a bit absent-minded at the time for personal reasons”; ... A challenge for technology is to support people in managing what to share and not to share (and in what form). Basically, technology support for reflection should let you do emotion work also during reflection, supporting you as a participant in the ongoing social process. Technology should not reveal to others the things you would like to hide. There are also things that should not be shared whether the learner cares about privacy (or self or others) or not – this might be a difficult thing for a computerized tool to address, but could partially be solved by mechanisms like checking for the occurrence of person names.

Reconstructing and making sense of work experience is in itself an affective and social process, where emotion regulation is key. A way of regulating emotion during collaborative reflection is to avoid the negative feeling (of self or others) associated with sharing something difficult or embarrassing. A good human facilitator will sometimes push people out of their comfort zone in order to help them learn im-

portant things from addressing difficult issues. A facilitator (or a computerized tool!) may for instance have the information that many participants are concerned about an episode or an issue (e.g. having commented on it individually), but without sharing with each other. A challenge for technology is to identify situations during a reflection session for which there would be a benefit in prompting more reflection, without e.g. enforcing situations that the participants would find emotionally intolerable or unpleasant.

The fact that certain emotions affect for instance decision-making or creativity, points to a possible role of technology in encouraging certain emotions during a reflection session. This might be done independently of the handling of the actual topics discussed, e.g. by generally promoting a positive and goal-directed attitude. A challenge for technology is to help encourage certain emotions conducive to a good reflection session, adapted to the specific needs and stage of the reflection process.

**Applying reflection outcomes to work** - Improved emotional competence may be an example of a reflection outcome that occurs as a side effect of reflecting on something else. There may however be concrete stories of successful (or less successful) emotion work or experiences otherwise directly addressing emotion, that others may want to learn from. Taking into account the necessary control of sharing (see above), one challenge for technology is whether to capture and share insights on emotional aspects of work that emerge as a side-effect of reflection on other topics.

## **Conclusions**

In this abstract we discussed the multiple role that emotions play in reflective learning. We also identified high-level challenges that need to be addressed when designing technology for reflective learning in the workplace.

We are currently validating the model with multiple scenarios from different work domains, including nursing and crisis management. As part of our future work we are planning to address the challenges that we described in this paper in the design of specific technology. Our final objective is to define guidelines for the design of tools for reflective learning that account for the multiple role of emotions as object and enabler of reflection.

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