The Functions of Sharing Experiences, Observations and Insights for Reflective Learning at Work

Viktoria Pammer[1], Michael Prilla[2] and Monica Divitini[3]

[1]Know-Center, Inffeldgasse 21A, Graz, Austria
[2]Information and Technology Management, University of Bochum, Germany
[3]Dptmt. of Computer and Information Science, NTNU, Trondheim, Norway

Abstract. In this paper, we are concerned with knowledge workers that want or need to improve their work performance, and choose to do so by reflective learning. These knowledge workers think back to own work experiences, critically re-evaluate them, and distil lessons learned relevant to their own work practice. We highlight in this work the functions of sharing own work experiences, observations and insights for reflective learning at work. Based on analysing existing Apps that support reflective learning in organizational context, we identify as different functions of sharing for reflective learning: 1) Shared data as baseline to (re-)evaluate own work. 2) Shared data as guideline for future behaviour at work. 3) Sharing as necessary prerequisite for collaborative or organizational learning. 4) Sharing to integrate multiple perspectives. Additionally, we show how knowledge of these functions of sharing can inform the design of Apps for reflective learning in an organizational context.

1   Introduction

Reflective learning is a method of self-directed learning that suits work-integrated learning well, because it does not require a teacher, coach or mentor. It is thus not surprising that reflective learning has since long been a part in formal education (e.g., of nurses, teachers, athletes' training), and is expected in many professions as "part of the job". More recently, efforts are being made to support reflective learning at work with information and computer technology. For instance, the SenseCam has been investigated as supporting school and university teachers [3], visualisations of group activities within software development environments as supporting software development as studied in [4, 5] for student software development projects, and ubiquitous computing technologies have been used to support reflection on a broad range of activities in the physical reality [7].

Technological support for reflective learning often includes the possibility to share "objects" such as the experiences that shall be reflected on, reflection outcomes in different stages of maturity (observations, ideas, solutions, etc.) or any artefacts relating to such experiences and outcomes (photos, audio- or video recordings, notes, physical objects, etc.). In this work, we investigate the question:

> Which different functions does sharing have for reflective learning in organizations?

Note that when we talk about sharing "data" below, we mean digital expressions of work-related experiences as well as of reflection outcomes (ideas, observations, insights, etc.).

2 Sharing and Reflective Learning in Selected Apps

We illustrate our analysis with three Apps (CroMAR, Talk Reflection, Task Detection) that support reflective learning in an organizational context. Functionalities and usage of the first two Apps, CroMAR and Talk Reflection, will be used in Sect. 3 to illustrate the different functions of sharing. The Task Detection App will be used in Sect. 4 to illustrate how knowledge about different functions of sharing can be used to shape the (re) design of reflection Apps.

2.1 CroMAR App: Reflecting on Critical Events

CroMAR[1] is a mobile augmented reality app that supports viewing and navigating of geo-tagged information (e.g., data from sensors, social media, radio broadcasts, video feeds), while the user is in the specific location where work took place. CroMAR provides access to information from different sources on top of the video feed from the device camera. Though the system has functionalities that might be relevant for reflecting on any working experience with a strong physical nature, the system has been specifically developed for reflection on emergency work. CroMAR supports emergency workers in after-event debriefing and reflection by providing multiple points of view of an event. Using CroMAR, it is possible to navigate information by mean of time, space and keywords. In this way we can expect the reflection process to be grounded in a context that helps to make sense of the information and reflect on alternative path of actions. An extended description of the system is available in [8].

The CroMAR App requires sharing in the sense that the CroMAR App's purpose is to make information collected by multiple people during a collective event available for reflection. In addition, sharing during a reflection session is supported by a video-conferencing functionality, and the functionality to send items captured within the CroMAR App via email. Finally, reflection outcomes can be captured and shared via a note-taking functionality. Sharing thus serves the purpose to collect multiple viewpoints and to enable collaborative reflection via the possibility to discuss on items within the App which in the end may lead to organizational learning (e.g., new best practices on handling emergencies).

---

[1] A description and screenshot are also available online: http://www.mirror-project.eu/showroom-a-publications/mirror-apps-status/84-cromar

2.2 Talk Reflection App: Reflecting on Conversations in Healthcare

Conversations between medical staff and with patients and or their relatives are typically challenging to medical and care staff, as they often include conveying bad news. (e.g., in the cases of a stroke, or of deteriorating bad health condition of elderly people in care homes), and the patients and relatives are often in difficult emotional (and cognitive in the case of patients) states during these conversations. On the other hand, good communication is necessary, as medical and care staff needs information on patients from relatives and because the quality of communication is a comparatively "cheap" (if not easy) way of raising the perceived quality of care. The Talk Reflection App[2] provides the possibility to document patient and relative talks as legally required and to add personal and private impressions. The first part (the legally required documentation of conversations) is public and shareable, and can be commented upon by colleagues. In the second part (personal impressions on the conversation), medical and care staff is asked to self-assess a conversation (in other words: asked to reflect upon the conversation), and has given the possibility to mark specific conversations for later discussion with colleagues or a supervisor. The App relates the self-assessments of physicians to the assessment of others to enable comparison to others. It also supports the exchange of documentation of conversations for the purpose of preparing for collaborative reflection sessions and commenting on shared documentations. The App also provides the possibility to explicitly document and share insights from reflection and to link to collect multiple conversations together and document (shared) insight to these insights in order to make them more understandable [10]. Sharing within the Talk Reflection App thus serves the purpose to compare own experiences within conversations to the experience of colleagues, to benefit from others' experiences and insights, and to enable collaborative reflection.

2.3 Task Detection App: Reflecting on Time Management

The Task Detection App (TD App[3]) captures work activities on a PC. Specifically, it captures window focus (and focus switching) on a PC. For each window in focus, it also determines the window title and if applicable the path to the window resource (e.g., for websites and documents but not for emails and Skype messages). In addition, users can record times that they spend on task activities such as "writing a project tender for customer XX" (the list of activities grows through usage as users add more and more of their own activities). Finally, the TD App also supports note-taking which serves the purpose to collect own observations and insights in relation to the work experiences. Thus the activities captured in the TD App are a mixture of automatically captured activities (focus switching) and manually captured task activities. The collected information is displayed i) on a timeline (which for most users illustrates a high fragmentation of work), and ii) as statistics in the form of pie charts. The

---

2   A description and screenshot are also available online: http://www.mirror-project.eu/showroom-a-publications/mirror-apps-status/90-prepapp

3   A description and screenshot are also available online: http://www.mirror-project.eu/showroom-a-publications/mirror-apps-status/93-taskdetection

App thus provides an "AS IS analysis" of how a user spends his/her time at work, and supports reflective learning regarding time management and self-organization.

The Task Detection App currently does not have sharing functionalities – but sharing could play several functions for reflective learning if integrated into the Task-Detection App as will be shown below in Sect. 4. Most significantly, people could profit from seeing how others manage their time and time-management-related challenges; and additionally systematic time management problems (and solutions!) may be identified by lifting the challenge of time management up from an individual level to a collaborative and organizational challenge, e.g., if the organisational culture is that meetings regularly take longer than expected or are started late.

3   The Functions of Sharing for Reflective Learning at Work

Our understanding of the functions of sharing for reflective learning in an organizational context has evolved from literature research, user studies [12], requirements engineering [6] and an analysis of the CroMAR and Talk Reflection App as well as of four more Apps described in [9, p38ff].

3.1   Shared Data as Baseline for Re-Evaluation

Learning by observing others and reflecting on similarities and differences in work performance, behaviour etc. is a valuable learning method at work [1]. This principle underlies the functions of sharing "shared data as baseline for re-evaluation" (this subsection) and "shared data as input for learning" (next subsection, Sect. 3.2)

We have observed in several user trials that users desire support in interpreting their work activities (e.g., were they exceptional, ok, to-be-improved?) How colleagues or experts perform their work activities (e.g., organise their time, carry out conversations with patients) is one powerful way to give individual employees a baseline to actually make sense of data about own work behaviour (e.g., is it normal that I switch tasks that often?). Additionally of course, best practices, compliance guidelines etc. can also serve as baseline for data interpretation –in a sense these are highly "compressed" and standardized way of how others do their work. In this function, shared data helps the learner to evaluate own experiences and performance.

In the Talk Reflection App, own assessment of a conversation can be compared to the assessment of others by exposing one's own experience to comments of others, and specifically asking for this kind of input. Shared data could also be used more explicitly as a baseline for comparison. In [2] for instance, users can compare their own emotional reaction to a situation with the reaction of colleagues to the same situation within a mood tracking application. In that context, the comparison feature has been shown to be highly appreciated by users.

3.2 Shared Data as Guideline for Future Behaviour

Shared data also influences learners with respect to future behaviour – how to act and to react in the future. Observing how others have dealt with specific challenges in the past, or taking up ideas, advice etc. from others gives the individual knowledge worker a broad range of possibilities for future behaviour. In addition, these possibilities have sometimes already been "evaluated" by others when given in the form of advice for instance.

In the Talk Reflection App for instance, sharing is available on request for a specific conversation (a single physician shares an experience with others and invites comments). Resolutions derived through the ensuing collaborative reflection are available in the spirit of lessons learned from experience or advice for App users.

3.3 Sharing is Necessary for Collaborative and Organizational Learning

From existing literature and empirical work as described in [11], it becomes clear that individual observations and reflections are an important starting point for iterative reflection sessions in organizations that can lead to organizational learning ultimately. Iterative reflection sessions are often necessary in an organizational context, as not everyone has all necessary knowledge to resolve a problem, or the power to implement or disseminate a solution identified during reflection. On the other hand, management levels have the power but may not have the detailed operative knowledge to identify problems in working processes, or efficient solutions. In this function, shared data serves as input to collaborative and organizational learning processes.

In the CroMAR App, this function of sharing is obvious, as event management is distributed and collaborative work – in order to reflect on an event and its handling by emergency forces in a meaningful way on a collaborative and organizational level.

3.4 Sharing to Integrate Multiple Perspectives

Finally, in some cases it is necessary to recognize the highly distributed nature of work and the impossibility for an individual to collect enough information to make sense of her experience taking into account different perspectives. For example, in the case of emergency work the perspective of an event that each worker gets is deeply influenced e.g., by the specific location one is working in and the role is playing. During our studies we identified this as challenging because the worker is reflecting on a necessarily partial vision of the event, while comparing different perspectives and identifying conflicting or complementary information might serve as a trigger for reflection. Experiences and observations from multiple actors should therefore be combined to help a worker to shade light on different aspect of the experience, reaching a more complete perspective on the object of reflection (in the case of emergency work, a specific emergency event) than any single actor can achieve.

To this purpose, CroMAR provides users with information that is collected by multiple actors, either automatically through sensors, or proactively, e.g., by capturing tweets from the population.

121

4 Using Sharing Functions to Inform App Design

Finally, we illustrate how knowledge about the existence of the different functions of sharing can inform the (re-) design of reflection Apps. The Task Detection App currently provides no sharing functionality. However, sharing anonymised data about time management patterns of colleagues could provide a baseline for evaluating own patterns (section 3.1), answering questions like "Is it normal that I switch tasks frequently"? Additionally, learners could share tips and tricks for dealing with time management challenges (section 3.2) and thus support others in changing their time management. Finally, some time management aspects are cultural and thus bound to the organization, like the widespread belief that email can be used as a synchronous communication medium, i.e. that emails get answered quickly. A solution to this cannot be implemented at an individual level but an organization-wide decision is needed. We can expect that data about the actual disruption this causes (e.g., from reflection of corresponding experiences) can inform this decision. Thus, the challenge of time management would be lifted from an individual to an organizational level (section 3.3). Likewise, groups can benefit much in reflection e.g., of their communication behaviour if individuals share data and perspectives describing their usage of communication tools (section 3.4).

5 Discussion and Outlook

The different functions of sharing in the context of reflective learning within organizations highlight that being able to get various data (experiences, observations, insights, ideas etc.) from multiple actors is critical both for the individual learners and their social context (teams and organization). At the same time, capturing relevant perspectives might be challenging. For example, people with a critical role might not provide input because they are too busy. To address this challenge it is necessary to introduce adequate scaffolding mechanisms and to provide easy modalities of input including automatically provided complementary data. In addition, it has become clear in first user trials that users are very interested in identifying the source of each input, and in comparing themselves to others This brings along challenging issues connected to visualization, ownership, and privacy.

Finally, the four different functions bring out the fact that the person who shares rarely benefits directly from sharing, and that depending on the exact sharing functionality and its usage in an application context, different actors benefit from sharing (colleagues as individuals, colleagues as team up to whole organization). We can only hypothesize at this point, that this is interesting input when considering the motivation of (and how to motivate) knowledge workers to actually share data.

This work is preliminary in the sense that the functions of sharing identified are based on the analysis of a very limited number of applications. Clearly, our first results need to be put in relation with the large body of research that exists on sharing and learning, and with other existing technological support for reflective learning in an organizational context. However, this analysis of different functions for sharing is

already valuable to inform the design of Apps that support reflective learning in an organizational context. Using the four functions above, existing technologies can be systematically analysed and extended with respect to which of the functions sharing needs to fulfil in a given App in a given application context.

Acknowledgements

References

1. Bandura, A. Social cognitive theory of human development. In: Husen, T. & Postlethwaite, T. N. (Eds.), International encyclopedia of education, 1996, 5513-5518, Pergamon Press.
2. Fessl, A.; Rivera-Pelayo, V.; Pammer, V. & Braun, S. Mood Tracking in Virtual Meetings. To be published: 7th European Conf. on Technology-Enhanced Learning (ECTEL), 2012
3. Fleck, R. & Fitzpatrick, G. Teachers' and tutors' social reflection around SenseCam images International Journal of Human-Computer Studies, 2009, 67, 1024-1036
4. Kay, J.; Koprinska, I. & Yacef, K. Educational Data Mining to Support Group Work in Software Development Projects Taylor and Francis, 2010, 173-186
5. Krogstie, B. Using Project Wiki History to Reflect on the Project Process 2st Hawaii International International Conference on Systems Science (HICSS-42 2009), Proceedings, 5-8 January 2009
6. Krogstie, B. (Ed) MIRROR Scenarios and Requirements. Deliverable D1.3, MIRROR IP. (2011)
7. Li, I.; Dey, A. K. & Forlizzi, J. Understanding my data, myself: supporting self-reflection with ubicomp technologies Proceedings of the 13th international conference on Ubiquitous computing, ACM, 2011, 405-414
8. Mora, S., Boron, A., & Divitini, M. (2012). CroMAR: Mobile Augmented Reality for Supporting Reflection on Crowd Management. International Journal of Mobile Human Computer Interaction, 4(2), 88–101. doi:10.4018/jmhci.2012040107
9. Pammer, V. & Fessl, A. (Eds): Individual Reflection Apps Version 1. Deliverable 4.2, MIRROR IP (2012)
10. Prilla, M., Degeling, M., Herrmann, T.: Collaborative Reflection at Work: Supporting Informal Learning at a Healthcare Workplace. Proceedings of the ACM International Conference on Supporting Group Work (GROUP 2012) (2012).
11. Prilla, M.; Pammer, V. & Balzert, S. The Push and Pull of Reflection in Workplace Learning: Designing to Support Transitions Between Individual, Collaborative and Organisational Learning. To be published at: 7th European Conf. on Technology-Enhanced Learning (ECTEL), 2012

12. Wessel, D., Knipfer, K. (Eds): Report on User Studies. Deliverable D1.2, MIRROR IP. (2011).