Reflection Analytics in Online Communities: Guiding Users to become active in Collaborative Reflection

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Abstract: As reflection helps practitioners to turn experiences into learning, communities of practices provide an environment to support reflection. We present a concept showing how reflection analytics in online communities of practice can help users to improve their reflection activity, guiding them to become active reflective participants. A prototype shows how our concept will be evaluated.

Keywords: reflection, reflection analytics, learning analytics, community of practice

1 Introduction

Reflection is a common activity at workplaces [1]. Our understanding of reflection is based on Boud, who describes it as a process with three steps: returning to past experiences, reassessing them in order to learn something for future actions [2]. While most research focuses on individual reflection or reflection in educational settings, we focus on collaborative reflection by a group of professionals at work, showing how reflection helps these groups to learn more than they could individually [3].

In earlier work, we have found that small groups of reflective participants (see 2.1) might suffer from a lack of time or the willingness of other group members to actively and frequently engage in reflection, and therefore, in line with [4], we propose to support collaborative reflection in communities of practice [5]. A community of practice is comprised of members doing similar work, e.g. working in a certain job role, and who have similar practices [6]. Although communities of practice can be informal and loosely organized, a community of practice is often supported by Information and Communication Technologies (ICT) such as online portals with discussion boards enabling members to exchange practice [6].

From an organizational perspective, enabling workers to reflect together through a community of practice has multiple benefits [6]: newer employees can benefit from the expertise of experienced workers, practitioners can discuss and share tacit knowledge, and spatially distributed organizations can connect employees working in different geographic locations. We found that integrating reflection support into

community tools provides benefits compared to offering standalone reflection tools, as the former integrates reflection into existing communication practices [7].

In the 'work in progress' approach presented in this paper, we aim at developing initial "reflection analytics" to guide reflection by participants in communities. We lean on the field of learning analytics, to capture and present the activity of learners to support reflection on their personal learning [8]. This approach has been proven effective for informal learning, and we believe such an analytics driven approach will also be effective in supporting reflective learners in communities.

This paper combines the concepts of collaborative reflection, communities of practice and provision of guidance to users in becoming reflective learners. In this paper, we describe our concepts, their corresponding background and an initial prototype.

2 Related work

2.1 Group dynamics in collaborative reflection

Models of reflection have been developed by Schön [1] and Boud [2] focusing on the individual. In practice people often discuss their experiences together and thus reflect together [3]. To engage in this collaborative reflection, participants need to communicate and discuss their experiences, which is at the core of reflection [7]. This is important for individual workers as well as for organizations [8].

In previous work we have analysed tools supporting groups reflection. We found that users assume roles based on the core activities of documenting, commenting and reading about different experiences, and that collaborative reflection depends on the distribution of these roles in groups. We found four basic roles [9]:

- **Documenters**: Users focussing on documenting experiences.
- **Commenters**: Users who comment mainly on other's documented experiences.
- **Readers**: Users reading many shared experiences and associated comments, but rarely becoming active by writing experiences or commenting on them.
- **Typical (full) reflection participants**: Ideally, users participate equally in all three activities (see above), thus actively supporting the reflection in the group.

In our analysis we found that active reflection groups either contained a core of typical reflection participants or a sample of enough documenters and commenters to provide activity in the reflection groups. We concluded that activating readers to start documenting and commenting as well as motivating commenters to document and vice versa is likely to increase reflective learning in the respective groups [9].

2.2 Group dynamics in communities of practice

Communities of practice offer opportunities for informal learning through facilitating discussions by members around practice, exchanging practices and experiences [6]. By being active in such exchange, learners can reflect upon how to integrate shared practices and experiences into their own daily practice. This is similar to support for

collaborative reflection, and the roles undertaken in communities of practice show further similarities.

In their classic model of how users interact in communities of practice, Lave and Wenger differentiate between a periphery comprised of new members or members with low levels of activity and the core of the community with a low number of highly active members [10]. Karalis [11] adds additional levels, ranging from passive observers to transactional and peripheral participants as well as those at the core. A common role often found in the periphery or passive zone of communities is that of a "Lurker" [12], similar to the readers we described above. In their concept of legitimate peripheral participation, Lave and Wenger emphasize the positive aspect of lurking (reading) as a way of getting to know the community before becoming active, and of learning from others' experiences [13].

Welser et al. [14] and Jones et al. [12] included in their typology "answer people", who mainly answer other users posts instead of writing their own, in a similar way to our description of commenters. Answer people are not connected to many members in the community, and interact on the periphery of a community. They can be seen as peripheral participants in the Karalis model. Furthermore, an analysis of the medical support community WebMD, by Introne, Semaan and Goggins [15], suggests that active core members spend a lot of time talking to new users. This suggests that active core members may play our commenter role. Users who are only active occasionally seemed to play the role of documenters (posting new content in the community). However, these findings may be specific to the particular type of community investigated, as users of WebMD seek advice around diseases rather than sharing practices.

Research is also concerned as to how people transition from the periphery of the community towards the core. An interesting model can be found in the Reader-to-Leader model [16], which states that by contribution (e.g., enough interesting and valuable content) and with motivation (e.g. recognition by others) users may increase their activity from being a reader to being a leader supporting others in communities.

2.3 Learning Analytics

Learning Analytics focuses on helping learners to understand their learning progress and optimising their learning, by a data driven analysis of action undertaken in learning environments [8]. However, most learning analytics research and practice has been undertaken in formal school and university contexts. Critically, much workplace learning is informal with little agreement of proxies for learning. While learning analytics in educational settings very often follow a particular pedagogical design, workplace learning is much more driven by demands of work tasks or intrinsic interests of the learner, by self-directed exploration and social exchange that is tightly connected to processes and the places of work [17]. Learning interactions at the workplace are to a large extent informal and practice based and not embedded into a specific and measurable pedagogical scenario.

Pardo and Siemens [18] point out that "LA is a moral practice and needs to focus on understanding instead of measuring." In this understanding "learners are central agents and collaborators, learner identity and performance are dynamic variables,

learning success and performance is complex and multidimensional, data collection and processing needs to be done with total transparency." This poses issues within the workplace with complex social and work structures, hierarchies and power relations.

Buckingham Shum & Ferguson [8] have added a focus towards the social aspects of learning including how learners interact with each other. The focus on the social aspect of learning analytics is more congruent with the informal and social nature of learning in communities of practice. Data is presented in a way to allow learners to take action upon it (actionable data). Showing learners analysis of their own behaviour can help stimulate reflection [8]. De Laat & Schreurs [19] demonstrate how social network analysis (SNA) and content analysis can contribute to learning analytics in community settings.

3 A concept to support reflection analytics

Our concept aims to balance the structure and roles in a community with respect to becoming an active reflective participant. The goal is to help users to transition from a reading role at the periphery to a more active role near the core of a community. To achieve this, we will deliver personal and group reflection (learning) analytics combined with personalized facilitation depending on the analytics, making users aware of their current reflection activities.

For this kind of scaffolding, we have to know which role a user is playing while reflecting in a ICT supported community of practice. For this we build on the metrics we used in our previous work on roles and groups in collaborative reflection (e.g. number of comments per time span, [9]) as well as through social network analysis ([19] and [15], who published an algorithm for SNA), which may help us to analyse interactions in collaborative reflection, and [12], who describe various metrics for online discussion forums to measure the activity of users. This work enables us to analyse the activity of users in real time and to compare it to their peers. Using this analysis, we can support each user type differently:

- **Guiding typical reflection participants**: Participants can be shown new or less popular threads to help users by providing their experiences as described in [15].
- **Guiding documenters**: Documenters are likely to have experiences that are helpful for others, and therefore should be encouraged to comment on other users' posts to enable reciprocity in the community. When receiving help by others, they could get encouraged to help others in turn.
- **Guiding commenters**: Users who often help others by commenting on posts can be encouraged to also create an occasional post themselves to provide experiences others can relate to in order to foster activity as described by [16].
- **Guiding readers**: Users who are reading a lot can be encouraged to start interacting with the community by for example asking questions to others about issues in their work life (see [20], who describe this as easier than answering; at least in Question and Answer forums). Readers also need to be made aware of the value their comments and posts may have for others. It is important **new users** are supported in order to ease them into using the platform and discussion area.

4 First Prototype

Our concept of support for these roles includes two steps. Firstly, we provide reflection analytics to make users aware of the role they currently play and secondly, we provide actionable prompts in the form of texts or images (related to activity prompts as mentioned in [21]) to users, proposing steps they can take to develop their role in the community like helping others or sharing own issues. Prompts have shown to be helpful in learning contexts [21, 22] to stimulate recipients to think about their actions, and we have developed a concept for prompts for collaborative reflection [5].

Our concept is currently work in progress and we have developed a prototype to evaluate it in practice. Fig. 1 taken from the prototype shows the three different individual roles in reflection as posts (new threads the person started, measuring documenter activity), comments (threads the user commented on, commenter activity), and reads (threads which the user looked into, reader activity). Fig 1. shows that the current user is reading more than average, writing an average number of comments, but is not writing many new posts. The prompt displayed in Fig. 1 suggests sharing own experiences, since the analytics shows the user is more of an answer-type person commenting on others threads.

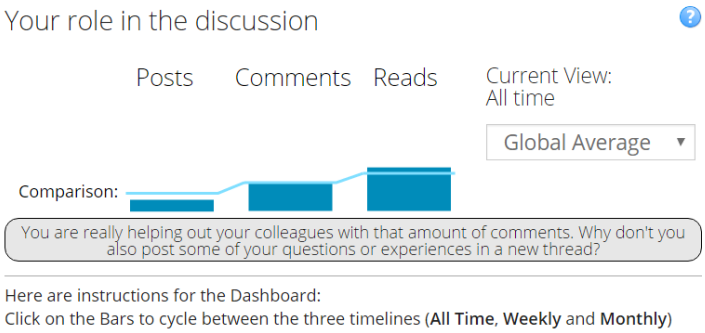

Fig. 1 Reflection analytics prototype

While the prototype is in its early stages, we are planning to extend it to implement and evaluate our concept. For example, we will develop the choice of prompts to analyse not only absolute numbers, but also trends in use and to inform users. Analysing the content created by a user may help us to identify whether the user is really taking part in collaborative reflection within a discussion (see our other work [23]), which might improve the choice of prompts, and it may allow us to understand user's interests. With the latter information, we may utilise recommendation engines to improve the choice of prompts, for example by recommending specific threads instead of telling new users to simply read something in order to get used to the community. Also it might be interesting to analyse whether user prefer to see their development over time in the community or rather this snapshot-based visualisation.

As we are currently finalizing the work on the prototype, we will be able to show and discuss these features at the ARTEL workshop. Subsequently we will evaluate the prototype in a real work environment to understand whether and how it influences user behaviour and whether and how this influences reflection in the community.

5 Conclusion

While our work is in still in progress with no evaluation having been conducted to date, we are convinced that our idea of reflection analytics contributes to the overall work being done in the context of (AR)TEL. It builds on a solid basis of our own and other research and is likely to help users to understand and improve their reflection activities in what will then be *reflective* communities of practice.

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