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Scaffolding Reflection for Collaborative Brainstorming

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Abstract. We present a reflection-on-action system supporting students' reflection and self-assessment after a tabletop brainstorming learning activity. Open Learner Models (OLMs) were core to the reflection task, to scaffold student's self-assessment of *egalitarian contribution*; and group interaction from *ideas sparked* from each other. We present multiple OLMs to the group generated from logs automatically captured from the collaborative activity. Our work advances the understanding of OLMs for brainstorm reflection, and the benefit of multiple OLM representations.

Keywords: OLMs, Visualisations, Brainstorming, F2F Collaboration

1 Overview

Analyzing alternative views of captured student data can be used to provide effective support to both students and teachers [2]. This is particularly crucial for developing collaborative skills for idea generation, and for students to reflect on how well they contributed to the group [3] and their interaction with others. Reflection involves actively monitoring, evaluating and modifying one's thinking and comparing it to peers. Reflection-on-action is when one evaluates their own process, "thinking *back on what [they] have done in order to discover [how] knowing-in-action [their actions] may have contributed to an unexpected outcome"* [4]. Open Learner Models (OLMs) have long been used as a method to support student reflection on their development of knowledge, skills, performance and understanding [1]. We support reflection with OLM visualisations immediately after the brainstorm (Figure 1—top).

We created models and their visualisations for two key aspects of group brainstorming: *contribution equality* in terms of the number of ideas created by each student, and group effect in terms of the number of *ideas sparked*. We scaffold each area differently. For *contribution equality*, we analyse the effect of two group OLMs on students' self-awareness, by presenting them in sequence, incrementing the detail of the student information shown (Figure 1—2,3). For *idea sparking*, we compare the inspection of the final product to a replay of the whole brainstorm process, and a hands-on reflection task with the presentation of a group summary OLM to students (Figure 1—5,6). We analyse the effect of the scaffolded reflection activity by measuring changes in self-awareness, from Likert data and students' written responses, after presenting each new piece of information. We examine whether *students gain greater insights from studying each of the different OLMs.*

adfa, p. 1, 2011.
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Fig 1. Egalitarian Contribution and Idea Sparking OLMs.

Our set of carefully designed OLMs, offered students the benefit of reflection on what they did, how they did it, and what they learnt. Our work enabled learners to step back and critically reflect on their actions. Multiple representations for both egalitarian participation and idea sparking led to insights for the majority of students. This work moves towards demonstrating OLM effectiveness for gaining insights into the collaborative process. Moving forward, we will examine the integration of these OLMs into an authentic classroom setting and explore their long-term use over multiple brainstorms.

References

1. Bull, S., Kay, J. Student Models that Invite the Learner In: The SMILI Open Learner Modelling Framework. IJAIED 17(2): pp. 89-120 (2007)
2. Martinez Maldonado, R., Kay, J., Yacef, K., Schwendimann, B. An Interactive Teacher's Dashboard for Monitoring Groups in a Multi-tabletop Learning Environment. In: ITS2012
3. Osborn, A. F. Applied Imagination. Charles Scribener's Sons, New York (1953)
4. Schon, D. The reflective practioner. Temple Smith, London: pp. (1983)