

Visual Feedback for Asynchronous Online Interaction: Exploratory Study on the Pattern of Other-regulation

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Abstract: This is a descriptive study of the other-regulation pattern in the asynchronous online discussion with the visual feedback. Visual feedback presented as a network diagram delivers intuitive and comprehensive information about the online interactions. Authors analyzed the messages *sent* and *received* and compared the data between more interactive and less interactive learners in terms of the other-regulation.

Introduction

A variety of group awareness tools have been suggested in order to promote interaction in CSCL (Reimann & Bannert, 2018). Enhancing the awareness of group's learning process as well as learner's own promotes the regulated learning in collaboration (Hadwin, Järvelä & Miller, 2018), because it allows monitoring the learning process that leads to feedback loop during learning. Although some studies examined the visualization of group interaction as a feedback tool to facilitate group awareness (Jo, 2009; Lim, Park, & Kim, 2014), more research on how the feedback tools on the group learning process change the quality of learning is still needed (Hadwin et al., 2018). This study aims to illustrate the regulation pattern when visual feedback on group interaction is provided.

Visual feedback in asynchronous online discussion

Data visualization, as a discovery tool, provides insight about the complex dataset. This advantage of data visualization makes it considered as a prescription in an education. For example, Lim and her colleagues (2014) used social network analysis (SNA) diagram as feedback on the interaction in the asynchronous online discussion. They compared the level of interaction (centrality) across visual-, text- and non-feedback groups. The result showed that the centrality of the visual feedback group was higher than the centrality of the text feedback and non-feedback group. The authors claimed that the visual feedback tended to provide intuitive and comprehensive information about the interaction. Given that SNA diagram illustrates the structure of group interactions, it is likely to support group awareness by facilitating monitoring of interaction at a glance. This study examines SNA diagram as visual feedback and its impact on interaction in line with the previous research. However, what is distinguished from relevant studies is its multi-dimensional approach. Despite that the interaction is not unidirectional but bidirectional, existing research gave attention on what learners sent, not what they received. Since an individual in the collaborative group is both sender and receiver, the impact of visual feedback also needs to be examined in two aspects: Changes in the interaction that learners a) *send* to, and b) *receive* from other learners.

Other-regulation

According to Hadwin et al. (2018), a large variety of terminologies used in the research of regulation in collaborative learning can be grouped into three primary modes: self-regulation in collaboration (SR: individual's metacognitive control), co-regulation (CoR: broad regulation through interpersonal interactions), and socially shared regulation (SSR: group-level regulation). Indeed, CoR is broadly defined so that it blurs the boundaries between SR and SSR (Lim, Lim, & Kim, 2017). Lim et al. (2017) suggested using the term other-regulation (OR) instead of CoR to specify the mechanism of individual's regulation toward other peers. They explained that the term CoR is rather a general term that covers a variety of regulation modes in collaborative learning. In this study, the term OR is employed instead of CoR following the framework suggested by Lim and her colleagues (2017) in examining the interaction. Since OR mainly concerns individual as its unit for process in describing the interpersonal interaction, this study gives attention to OR for exploring how each learners' behaviour change as a reaction to visual feedback.

Based on the review of the literature, following research questions have been examined: RQ1. When visual feedback is provided, is there any difference between messages relevant to other-regulation sent *from* learners with a high versus low level of the interaction? RQ2. When visual feedback is provided, is there any difference between messages relevant to other-regulation sent *to* learners with a high versus low level of the interaction?

Research method

Online discussion threads generated by 23 college students enrolled in media literacy course at the university located in South Korea were analyzed. Participants were randomly assigned to three different groups, and the discussion topics were changed on a weekly basis. After the weekly discussion, visual feedback based on SNA diagram was provided for each discussion group. Specifically, the weekly visual feedback illustrated structural relationships among the learners by representing the learners as nodes and their relationships as links. The size of the node indicated the in-degree centrality, which is one of the indices of the SNA that describes the level of the attention gained which particularly reflects the prestige and popularity of each node. The direction of the link means who sent the message to whom, and the thickness of the link means the intensity of the interaction.

The content of the online discussion messages was analyzed in terms of the theoretical framework of the OR. Messages were segmented into smaller units based on its meaning, which were coded afterwards following the coding scheme suggested by Janssen et al. (2010). The coding scheme initially categorizes messages as task-related and social activity. The task-related messages included informational activities relevant to performance and regulation of task progress, while social messages included activities relevant to relationship, shared mental model, and regulation of collaboration. Next, more interactive (high degree of centrality: HC) and less interactive (low degree of centrality: LC) learners were identified and analyzed according to their OR behavior patterns. That is, the coded messages relevant to OR 1) sent by HC and LC learners, and 2) received by HC and LC learners, were counted and compared.

Conclusion

For RQ1, messages sent from HC and LC learners were analyzed. Both HC and LC learners presented task-related messages more frequently than social messages. As the discussion progressed, the task-related activities gradually increased while the social activities decreased. In the 3rd week, social messages from the LC learners were not found. Specifically, it was inferred that more interactive learners use a variety of OR strategies than less interactive learners. More than 90.0% of the messages from LC learners were task-related messages that is mainly informational. On the contrary, the HC learners sent both task-related (80.3%) and social (19.7%) messages, and the HC learners' task-related messages included regulation of task progress as well as informational messages. For RQ2, messages sent to HC and LC learners were analyzed. Overall interaction pattern was similar to the result of RQ1. An interesting finding was that the HC learners received messages relevant to the relationship (11.7%) more than LC learners (3.8%) did. Also, only HC learners received messages relevant to the regulation of task progress (1.8%) and shared mental model (1.9%) while none of the LC learners did. This study illustrated the interaction pattern of OR when the visual feedback was provided. As Hadwin and her colleagues (2018) pointed, a visualization tool that informs the learning process such as learner dashboard can trigger and sustain regulated learning. When the SNA diagram was presented, the HC learners sent and received both personal and task-related messages, whereas LC learners mostly sent and received task-related messages.

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