

CASE STUDY

Using the FROCOLE app for feedback and reflection in group learning

Karel Kreijns

Maartje Henderikx

General abstract:

Group learning is an active learning pedagogical technique where group members collectively work on a joint task to achieve certain learning outcomes that benefit all. Literature has shown better learning outcomes with group learning when contrasted with individual or competitive learning. However, these results can only be achieved when the group learning is structured in a way that facilitates productive social interaction which cannot be taken for granted. Productive social interaction not only means that the dialogues, argumentation and reasoning of the group members are epistemic and transactive but also that group members have to regulate their and each other's learning as well as the learning of the group as a whole. The FROCOLE app was specifically developed by the Open Universiteit to structure these latter activities by means of feedback and reflection. In this case study session, we discuss the theoretical foundation of the FROCOLE app, its design and implementation, and how it was deployed in several pilots. We found that the FROCOLE app was easy to use and did support feedback and reflection among group members but only for those groups that saw the deeper meaning of the FROCOLE app right at the beginning.

Extended summary:

Group learning is an active learning pedagogical technique where group members collectively work on a joint task to achieve certain learning outcomes that benefit all (Johnson & Johnson, 2018). However, these results can only be achieved when the group learning is structured in a way that facilitates productive social interaction which cannot be taken for granted (Kreijns et al., 2022). It is precisely for this reason that Johnson and Johnson (2018) put forward Structure-Process-Outcome theory and Social Dependence theory. Structure-Process-Outcome theory (Watson & Johnson, 1972) states that the processes of interaction directly determine the learning outcomes and structuring the group learning only does so indirectly. Social Interdependence theory (Johnson & Johnson, 2003) informs designers of group learning ways for structuring the social interaction, namely via positive interdependence, the situation in which group members perceive that they can reach their goals only if the other group members also reach their goals. Once perceptions of interdependency exist, productive social interaction may arise; the desired social interaction may be in the form of dialogs, argumentation, or reasoning. Productive social interaction means that it is epistemic and transactive. Epistemic means that group members generate new ideas and concepts, elaborate on them and explain why they are important to consider (Ohlsson, 1996) whereas transactive means that group members build upon each other's ideas or react on each other's comments, thereby enhancing learning (Popov et al., 2017).

Productive social interaction also means that group members have to regulate their and each other's learning as well as the learning of the group as a whole. These regulation processes need (peer) feedback and reflection (Panadero et al., 2016; Kim & Lim, 2018). Hereby, the peer-feedback should not only deal with the subject matter but should also inform students how the group learning

progresses (educational dimension) and how the group dynamics develop (socio-emotional dimension). The latter implies that the regulation processes involve the regulation of the socio-emotional processes, usually referred to as the regulation of emotion and motivation to keep the group dynamics healthy (Järvenoja et al., 2013). However, here too the problem is that all these regulation processes cannot be taken for granted because they require awareness about their importance for group success. Also explicit inclusion of feedback and reflection episodes while working and learning together is necessary. As a solution and based on the work of Phielix (see Kirschner et al., 2015), the FROCOLE (=Feedback and Reflection in Online COLlaborative LEarning) app was specifically developed by the Open Universiteit to structure the feedback and reflection processes so that group members can regulate themselves (self-regulation), the other members (co-regulation) and the group as a whole (group regulation). We took the design decision that FROCOLE should be an app to be independent of any specific electronic learning environment (Blackboard, Canvas, Brightspace) to encourage broad use of the app. Basically, the FROCOLE app encompasses two kinds of radar diagrams, one for the self- and the co-regulation (referred to as individual feedback radar diagram) and one for the group regulation (referred to as group feedback radar diagram). Each axis of both radar diagrams represents an indicator; an indicator may refer to some aspect from the educational dimension (e.g., productivity) or from the socio-emotional dimension (e.g., being friendly) that has to be judged by the group members. Thus the first radar diagram is concerned with how a student perceived him/herself in the group versus how the group perceived that student (a mean is calculated using the judgements of the other students about that student). The second radar diagram is concerned with how the student perceived the group versus how the other students perceived the group (a mean is calculated using the judgements of the other students about the group). Each student in the group, thus, can compare his/her own judgement versus that of the group which may give a reason for reflection. The radar diagrams are shown graphically and the interface is based on the principle of direct manipulation interfaces (Shneiderman, 1983). A direct manipulation interface means that students can enter their judgments directly by dragging a slider by means of their fingers thereby avoiding to enter their judgement textual via lists that have to be scored. The FROCOLE app is available from the App Store and from the Play Store.

The FROCOLE app has been tested in several pilots. In one pilot (using a first-year course about Entrepreneurship & Sustainability at a University of Applied Sciences) the app's usefulness (13 questions adapted from de Jong (2017) and usability (the System Usability Scale; see Brooke, 1996) was tested. The results revealed that the students perceived using the app as valuable and found it easy to use for giving feedback. They also indicated that using the FROCOLE app made the reflection process easier. Using the app also made them more aware of their performance in the group. Most positive about the app, according to the students, was the ease of use and the way the graphics provided instant insight into the group versus oneself. The second pilot was in an international course on CSCL. This course had an orientation, solo, testing and a collaboration phase. The app was used from the third week of the six-week collaboration phase. The students found that the FROCOLE app was easy to use and did support feedback and reflection among group members but only for those groups that saw the deeper meaning of the FROCOLE app right at the beginning. In contrast, the other groups saw the FROCOLE app more or less as a tool for collecting data for research purposes and, consequently, they used the app infrequent and missed the intended purpose of the app.

In this case study session we will demonstrate the app and involve the audience of the session by giving them a group work exercise. This way, they can experience the functioning of the FROCOLE app with respect to feedback and reflection.

References:

- Brooke, J. (1996). SUS: A 'quick and dirty' usability scale. In P.W. Jordan, B.A. Thomas, A. Weerdmeester, I.L. McClelland (eds), *Usability evaluation in industry* (pp. 189–194). London: Taylor & Francis.
- de Jong, B. (2017). *Evaluaties van Educate-it ICT tools. Overzicht van resultaten van kwantitatieve en kwalitatieve evaluaties van tools die ingezet zijn via Educate-it*. Universiteit Utrecht. Available from <https://educate-it.uu.nl/wp-content/uploads/2019/12/Meta-analyse-Educate-it.pdf>
- Järvenoja, H., Volet, S., & Järvelä, S. (2013) Regulation of emotions in socially challenging learning situations: an instrument to measure the adaptive and social nature of the regulation process, *Educational Psychology*, 33(1), 31–58, DOI: 10.1080/01443410.2012.742334
- Johnson, D. W., & Johnson, R. T. (2003). *Social interdependence: The interrelationships among theory, research, and practice*. The Center for Cooperative Learning, The University of Minnesota.
- Johnson, D. W., & Johnson, R. T. (2018). Cooperative learning: The foundation for active learning. In S. M. Brito (Ed.), *Active learning – Beyond the future* (pp. 59–70). IntechOpen. <https://doi.org/10.5772/intechopen.81086>
- Kim, D., & Lim, C. (2018) Promoting socially shared metacognitive regulation in collaborative project-based learning: a framework for the design of structured guidance, *Teaching in Higher Education*, 23(2), 194–211. <https://doi.org/10.1080/13562517.2017.1379484>
- Kirschner, P. A., Kreijns, K., Phielix, C., & Franssen, J. (2015). Awareness of cognitive and social behaviour in a CSCL environment. *Journal of Computer Assisted Learning*, 31(1), 59–77. <https://doi.org/10.1111/jcal.12084>
- Kreijns, K., Weidlich, J., & Kirschner, P. A. (2022). *Pitfalls of social interaction in online group learning*. In Z. Yan (Ed.), *Cambridge Handbook of Cyber Behavior*. Cambridge University Press.
- Ohlsson, S. (1996). Learning to do and learning to understand: A lesson and a challenge for cognitive modeling. In P. Reimann & H. Spada (Eds.), *Learning in humans and machines* (pp. 37–62). Oxford, England: Pergamon, Elsevier Science.
- Panadero, E., Jonsson, A., & Strijbos, J. W. (2016). Scaffolding self-regulated learning through self-assessment and peer assessment: guidelines for classroom implementation. In D. Laveault & L. Allal (Eds.), *Assessment for learning: Meeting the challenge of implementation*. Boston: Springer
- Popov, V., van Leeuwen, A., Buis, S. C. A. (2017). Are you with me or not? Temporal synchronicity and transactivity during CSCL. *Journal of Computer Assisted Learning*, 33(5), 424–442. <https://doi.org/10.1111/jcal.12185>
- Shneiderman, B. (1983). The future of interactive systems and the emergence of direct manipulation. *Behaviour & Information Technology*, 1(3), 237–256.
- Watson G, & Johnson D. W. (1972). *Social psychology: Issues and insights* (2nd ed.). Philadelphia, PA: Lippincott.