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Meeting the needs of today's society – developing collaborative problem solving skills

16. The Nordic Society for Philosophy of Education

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Abstract: In a globalized world, the ability to collaborate in problem solving is essential. Increasingly high demands are placed on the ability to collaborate with people with different perspectives and cultural background, and our educational systems plays an eminent role in the development of such an ability. On the other hand, both private and professionally, aspects of individualism and expectations to compete are very common. Accordingly, it may not be a clear-cut decision for individuals to prioritize the development of collaborative problem solving skills. The PISA survey has been investigating problem solving skills since 2003 and in PISA 2015 *collaborative* problem solving was tested for the first time (OECD, 2017). The results show good individual problem solvers are not necessarily successful in collaborative problem solving.

The aim of the study is to contribute knowledge about how a designed milieu can contribute to collaboration in problem solving and to development of collaborative problem solving skills. In particular, it is stressed how different features of the milieu become important throughout the collaborative work.

Theoretically the study is framed by Brousseau's theory of didactical situations, the concept of milieu and three types of situations: situations of *situations of action*, *situations of formulation*, and *situations of validation* (Brousseau, 2006). Data is collected from collaborative problem solving in mathematics, where a designed tool-box with requests to interact is included in the milieu to encourage and support the collaborative work. The negotiation of meaning and the extent to which real collaboration come into being is analyzed in the three types of situations. A detailed analysis of the extent to which the students' milieu is shared and the role the tool-box has for the milieu will contribute in-depth knowledge about how the development of collaborative problem solving skills can be supported.

Preliminary analyses reveal students' interactions with the design element of the milieu, the tool-box, do largely influence which types of situations the students engage in and how the collaboration proceeds. Unexpectedly, the collaboration resulting from the use of the tool-box was not only fruitful. In some cases, it was used in a rather mechanical manner, distorting the collaboration from the problem solving. Social conventions also seem to hinder the validation to proceed, because of a strive for agreement.

The study is relevant in a modern society where collaboration skills are essential. In addition, collaborative problem solving seems to be an equality issue in the Nordic countries. In all nordic countries except Norway the percentage of top performers in collaborative problem solving among top performers in science, reading and mathematics is higher than the OECD average (OECD, 2017). This may indicate it is mainly the top performers that are given support in development of

collaborative problem solving skills, something that needs to be considered in education.

Brousseau, G. (1997). *Theory of didactical situations in mathematics: Didactique des mathématiques, 1970–1990* (Vol. 19): Springer Science & Business Media. Edited by N. Balacheff. Dordrecht: Kluwer Academic Publishers.

OECD (2017). *PISA 2015 Results (Volume V): Collaborative Problem Solving*. OECD Publishing: Paris.