

EXPLORING TECHNOLOGY SUPPORTED COLLABORATIVE AND COOPERATIVE GROUP FORMATION MECHANISMS

Mia Čarapina¹ and Ivica Botički²

¹University of Applied Sciences, Zagreb, Vrbik 8, 10000 Zagreb, Croatia

²University of Zagreb, Faculty of Electrical Engineering and Computing, Unska 3, 10000 Zagreb, Croatia

ABSTRACT

This paper reflects on the systematic literature review paper (in progress), which analyzes technology enhanced collaborative and cooperative learning in elementary education worldwide from 2004 to 2015, focusing on the exploration of technology mediated group formation. The review paper reports on only few cases of technology supported methods of group formation, since in the majority of analyzed papers groups are mostly formed before the activity by teachers or researchers. This paper suggests a novel approach by proposing an adaptive model for technology supported group formation.

KEYWORDS

Collaborative learning, elementary education, collaborative group formation

1. INTRODUCTION

Collaborative learning is "a situation in which two or more people learn or attempt to learn something together" (Dillenbourg 1999), whereas in cooperation partners split the work, solve sub-tasks individually and then assemble the partial results into final output (Johnson & Johnson 1999). In order to work together members can be grouped based on various parameters such as gender, learning style or aptitudes forming homogenous or heterogeneous groups. In the context of time groups can be periodically active (for example every week) or continuous through the whole period of the activity. Furthermore, group members can even change during the activity.

This paper focuses on the exploration of technology supported methods of group formation before or during the collaborative or cooperative activity, focusing on elementary education worldwide, analyzing results obtained from a literature review research paper (in progress). The review paper resulted in 118 articles addressing technology supported collaborative and cooperative learning in elementary education of which 5 report on system mediated group formation.

2. GROUP FORMATION MODEL

Based on the review results, the authors detected and defined four methods of group formation which is either organized before the activity or mediated during the activity by the system: 1) system mediated heterogeneous pre-grouping (Huang et al. 2011) where learners are assigned to groups by the system based on their responses to a learning styles questionnaire given before learning activities, 2) random pre-grouping by the system before the activity (Wyeld et al. 2012), 3) dynamic grouping (Nussbaum et al. 2009) as defined by Zurita (Zurita et al. 2005) where members are grouped "during collaborative activity for reaching a given educational objective", and 4) a variant of dynamic grouping (Wong et al. 2011; Boticki et al. 2013) where groups are dynamically established prior to the learning activity. Selected papers are presented in the Table 1.

Table 1. Research papers with automatized group formation and the accompanying grouping characteristics.

Article	Time of group formation	Group characteristics	Group formation
(Nussbaum et al. 2009)	During the activity	Heterogeneous	Dynamic and random
(Wong et al. 2011)	Pre-organised	Heterogeneous	Random
(Huang et al. 2011)	Pre-organised	Heterogeneous	Random
(Wyeld et al. 2012)	Pre-organised	Heterogeneous	Random
(Boticki et al. 2013)	Pre-organised	Heterogeneous	Random

The authors of the paper propose an adaptive model for dynamic group formation (Figure 1). In order to form the groups, the system collects the data about individual learners using this model. The data is analyzed and processed with an adequate learning analytics algorithms and adaptation module to be later used in forming adequate groups for collaborative or cooperative tasks. Once the activity starts, the system collects both individual and group data and dynamically regroups peers if needed. Regrouping outcome can be the termination of group work in order to start individual work assignments, merging of two or more different groups or the combination of group members with members of another group.

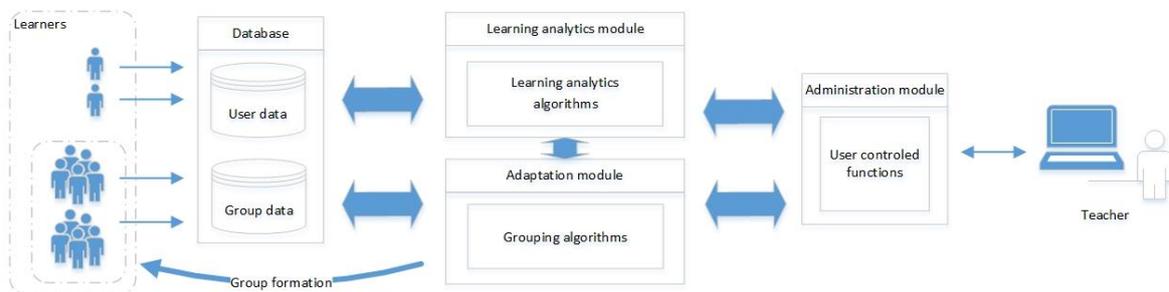


Figure 1. The adaptive grouping mode

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