MONITORING THE RESULTS OF STUDENTS' COLLABORATIVE LEARNING

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Abstract. *Collaborative learning is the process of two or more students working together to solve the group task at hand. In this scientific work we are going to discuss about monitoring of the student final reflection from collaborative learning.*

Keywords: *collaborative learning, indicators, collaborative activity, cognitive activity, meta-cognitive activity, comprehension monitoring, monitor, evaluate, adaptive, beneficial, competency.*

Introduction

The monitoring by teachers of collaborative, cognitive, and meta-cognitive student activities in collaborative learning is crucial for fostering beneficial student interaction. Let's give a definition for a collaborative learning. Collaborative learning can be defined as the process of two or more students working together to solve the group task at hand [1]. They can achieve this by sharing their knowledge and thus building common ground and joint knowledge [2]. In this sense, collaborative learning goes beyond cooperative learning because cooperation is defined as a situation where a group task is divided into independent subtasks to be solved individually and then to be assembled to form the final solution [3,4]. Cooperation can take place during collaboration, but through joint knowledge building, collaboration is more than the sum of its parts [4]. So, as you can see, in this article, we focus on collaborative learning.

Materials

Collaborative learning has proven to be highly effective and often superior to individual learning in terms of academic achievement and attitudes [5]. However, its effectiveness largely depends on the quality of student interaction, which can be evaluated on three dimensions, namely students' (1) collaborative, (2) cognitive, and (3) meta-cognitive activities as defined in the following [6]: (1) When students successfully collaborate with each other, they are actively engaged, build common ground, and share information and ideas. (2) Asking targeted questions and giving elaborate explanations, providing reasons for a line of argumentation, and comparing different solution paths are visible indicators of cognitive activities. (3) Meta-cognitive activities are indicated by comprehension monitoring, checking for errors, as well as critical checking of ideas and the final solution. When teachers want to evaluate the effectiveness of student interaction, they are supposed to monitor student interaction along these three dimensions.

Methods

Monitoring competency can be regarded as teachers' professional vision concerning student interaction in collaborative learning. The professional vision of teachers is defined as the ability to notice crucial classroom events, and in a second step, to reason about these events [7]. While monitoring student interaction, crucial classroom events are those that are meaningful indicators of collaborative, cognitive, or meta-cognitive activities [3] such as building common ground, sharing information and ideas, asking targeted questions and giving elaborate explanations, as well as checking for errors (see Tables 1, 2, and 3). These behavioral indicators

are defined by students' utterances which teachers can observe and, drawing on their professional knowledge, interpret as indicators for collaborative, cognitive, or meta-cognitive activities. Reasoning about student behavior further draws on teachers' professional knowledge to analyze and explain the situation at hand [8].

Results

Thus, noticing indicators of student activities is a precondition for reasoning and is also shaped by explicitly learned pedagogical knowledge such as teaching aims, teaching strategies, and definitions of collaborative learning, but also personal experiences and teacher beliefs [8]. In this sense, professional vision is a kind of knowledge-based processing. Based on explicitly learned pedagogical knowledge, teachers decide which events in the classroom are crucial, and thus have to be focused on.

Table I. Checklist of behavioral indicators (Coll.act.)

Collaborative activity [8]			
Indicator		Example (pro)	Example (contra)
1	The group members share their ideas.	$y'' + y' - 12y = 0$ is the second order homogeneous differential equation	1-2 group members don't contribute any ideas of their own accord, even though it would have been possible.
2	The group members respond to each other's ideas	Right, and $y'' - y' = 0$ is also the second order homogeneous differential equation	Ideas are ignored by not responding or by saying something that doesn't relate to the previous idea.
3	The group members encourage each other to contribute [9].	What do you think, Anvar?	Group members who don't contribute to the group work or stay silent for a long time are not being paid attention to.
4	The group members treat each other with respect.	Letting others finish speaking; listening to each other (looking at the person who is speaking); engaging in the group work instead of letting the others do all the work; praising each other.	Interrupting; doing something else while a group member is speaking; reacting in an irritated way.

Table II. Checklist of behavioral indicators (Cog.act.)

Cognitive activity			
Indicator		Example (pro)	Example (contra)
	The group members ask each other questions if they do not understand.	I don't understand why you said the order of equation is equal two.	There are not any questions, because … - the group members do not have any comprehension problems or ... - the group

			members do not ask even though they did not understand both are to be assessed as not present.
	The group members give their own reasons for their statements.	$y''-y'=0$ is the second order homogeneous differential equation like $y''+y'-12y=0,$ because their orders are the same.	Orders are the same.
	The group members think out loud.	Well, $y''-y'=0$ can be with order two and only!	I've got it! We have two equations where the orders are the same!
	The group members connect content that is already familiar to new content that is to be learnt.	Looking for the definition of the order DE, we have no doubts.	There is no evidence that the group actively use their prior knowledge from previous lessons.

Table III. Checklist of behavioral indicators (Meta-cog.act.)

Meta-cognitive activity [10]			
Indicator		Example (pro)	Example (contra)
1	The group members point out mistakes to each other.	No, that's not right, $y''+y'-12y=0$ has the same order.	Mistakes which were made are not found or addressed by the order group members.
2	The group members express lack of understanding and/or what they have already understood.	*I don't understand.* Expressing lack of understanding *That's easy.* Expressing that something is already understood.	There are not any statements about a lack of understanding and/or about what is already understood.
3	The group members search for ways to make progress on the problem at hand	We could write down the definition of the order of differential equations to see with the illustration.	No idea at all!

Discussion

The professional vision of teachers has been shown to positively affect student learning. One possible explanation is that the better teachers can monitor and evaluate their students' needs, the better they can enhance their students' learning by providing adaptive support [9]. When monitoring student interaction, the teacher checks if students are following the prescribed activities, for instance of a given collaboration script, by attending to behavioral indicators. When the teacher observes a lack in beneficial student activities, he or she may decide to intervene and

support the student interaction [10]. Monitoring competency, regarded here as a form of professional vision, can therefore be seen as pertinent for enhancing beneficial student interaction, that is, enhancing students' joint knowledge building and each group member's individual learning gains.

Conclusion

We use the notion of competency because, during the whole monitoring process, the teacher must act in a flexible and adaptive manner in response to the specific situation. For this competent behavior, situation-specific skills are needed, such as noticing, reasoning, and decision-making. We concentrate on teachers' noticing of crucial classroom events, which is the first step of professional vision and one facet of monitoring competency. This means in our study preservice teachers are only required to detect students' utterances and interpret them as indicators of collaborative, cognitive, or meta-cognitive activities during student interaction. Next, we describe video-based training programs to enhance professional vision.

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