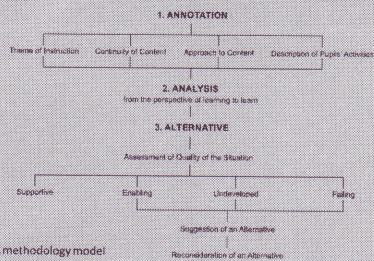


# Optimizing classroom situations from the perspective of learning to learn: AAA method as an instrument for improving instructional quality in geography lessons

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## 1. Theoretical background

Learning to learn depends on the quantity and quality of opportunities to learn which are provided and made use of during instruction (in the context of instructional quality). Learning to learn can be researched through opportunities to learn (McDonnell, 1995) that are provided during instruction. Classroom situations as a part of instruction are evoked by pupils' work with subject matter when solving a learning task. Opportunities to learn can be regarded as "potentials of lesson structures and situations for student learning processes" (Seidel & Prenzel, 2006, p. 229). It can be assumed that opportunities to learn depend on the complexity of learning tasks – especially demanding learning tasks can support metacognition and higher cognitive processes which are necessary for developing learning to learn (c.f. Rheinberg & Vollmeyer, 2000). The concept of learning to learn is multidimensional and rather vague, which brings obstacles to its research (Waytens et al., 2002; Black et al., 2006).



Picture 1. AAA methodology model

## 2. Methodology

Our aim is to identify the potential which classroom situations offer pupils from the perspective of learning to learn. AAA methodology is used as it works according to principles of reflective practice. AAA methodology (Picture 1.) is a three step methodological approach: (1) **Annotation** is a brief summary of the classroom situation and its context. (2) **Analysis** focuses on specific aspects of the situation (here learning to learn) in order to reveal the potential for a qualitative change. Classroom situation analysis from the learning to learn perspective focuses on: (a) how pupils gain new knowledge, (b) conceptualization, (c) pupil's exploration and (d) metacognition, management of learning and motivation (Table 1). (3) **Alternatives** are suggested, reconsidered, and discussed. The situations can be realized in four qualitatively different levels: (1) *failing*, (2) *undeveloped*, (3) *enabling* and (4) *supportive*. There is need for alternatives in the case of failing and undeveloped situations (Table 1). The poster focuses on what potential a particular situation offers for pupils from the perspective of learning to learn. Analyzed situation comes from a lower secondary school and deals with the topic "Warm and cold front". It was drawn from the TIMSS Science Video Study 1999 (Roth et al., 2006).

Table 1  
Operationalization of categories for evaluation of the quality of classroom situations from the perspective of learning to learn

Situation	how pupils gain new knowledge	conceptualization	pupil's exploration	metacognition, management of learning and motivation	Need of alternatives
failing	-	-	-	-	+++
undeveloped	+	-	-	-	++
enabling	+	+	+ or -	-	+
supportive	+	+	+	+	

The quality indicators (+ or -) depend heavily on the situational context and serve only as an aid in the process of analysis.

## 3. Insight into instruction

### 3.1 Annotation

#### Context of the classroom situation – goal and theme of instruction and continuity of content

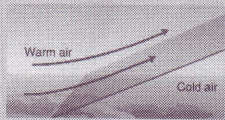
The analyzed situation from 8<sup>th</sup> grade lesson was videotaped for the purpose of the TIMSS 1999 videostudy. The lesson was the continuation of the lesson with the theme "Climate and air masses in the Czech Republic". The goal of the analyzed situation was the introduction of a new theme – "Warm and cold front".

#### Approach to content – teacher's and pupils' activities

The teacher projects pictures of the vertical section through warm and cold front (Picture 2. and 3.) and introduces new subject matter. Firstly she promises simpler picture from the textbook (she is aware of the complexity of the theme). She says that firstly it is necessary to revise the effect of the atmospheric pressure on the earth's surface. Pupils are listening to the teacher's presentation and they are answering questions. They can work with the textbook and with the atlas.

#### Transcript of the classroom situation (T – teacher, P – pupil, PP – pupils)

10:55 – 14:23  
 T: (...) How is cold and warm air related to the pressure on the surface of the Earth? (...) What did we say in the last lesson?  
 PP: It is heavier.  
 T: Good. It causes more pressure and it is heavier. Warm air, James?  
 P: Smaller pressure and it is lighter.  
 T: Good. (...) There is cold air above the Czech Republic and there is warm air flowing into our country. Try to guess from the picture what comes after that.  
 P: They will be mixed...  
 T: They will not, watch out. It is heavy. It is staying down near the ground, the warm air is lighter.  
 P: It will be, it will be warmer in the mountains than...  
 T: It is something different. Is it not obvious with these arrows? [[points to picture 2.]] What happens?  
 P: That cold air goes up?  
 T: Will it go up if it's heavy?  
 PP: No, down.  
 T: So once again [[points to picture 2.]]. (...) And if warm air is going to the higher spheres of the atmosphere what happens with water vapors which it contains?  
 P: Precipitation is created.  
 T: Good. The air turns cold (...). The movement of the warm front is quite slow (...). The other way round we take cold air, cold front [[points to picture 3.]]. Will someone figure out what will happen in the atmosphere?  
 P: The cold air will squeeze under the hot air.



Picture 2. Vertical section through warm front



Picture 3. Vertical section through cold front

### 3.2 Analysis

Our analysis focuses on the potential which the classroom situation offers to pupils from the perspective of learning to learn. The classroom situation was analyzed with regards to (a) how pupils gain new knowledge, (b) conceptualization, (c) pupil's exploration and (d) metacognition, management of learning and motivation.

The teacher tried to present new knowledge through subject matter which pupils already knew (the question about the pressure at the beginning of the classroom situation). Although the teacher was introducing new subject matter, she tried to engage pupils actively. She worked with demonstration (Picture 2. and 3.). She supported pupils and tried to guide them patiently (Is it not obvious with these arrows?). When she assumed they did not understand she tried to help them again with the pictures and repeated the questions.

We found three examples of misconception (in the case of mixing air masses, mentioning the inversion and suggestion that cold air goes up). The experienced teacher recognized them and turned pupils' attention to these mistakes.

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### 3.3 Alternative

#### Assessment of the quality of the situation

On the level of how pupils gain new knowledge the teacher guided pupils to classification of information and using them in the learning process. Opportunity to learn was not sufficiently exploited from the perspective of developing pupil's thinking – teacher could have given pupils more space to explain geographical phenomena on their own (as in the case with precipitation). The new subject matter should have been more connected to real life, too (weather as the phenomenon around us).

On the level of the conceptualization pupils worked with general terms and symbols. They put things into connection and connected knowledge from different subjects (physics) into broader units. In the classroom situation we missed pupils' exploration and in connection with exploration cognitive activation.

The highest level of learning to learn was reached just partly because of missing metacognition. We missed metacognition of the thinking and learning process itself. The management of learning and motivation were strongly applied in the classroom situation. Pupils showed their interest in learning (because of teacher's support and patience, too).

The aim to develop learning to learn was achieved to a great degree. As far as the presentation of the new subject matter is concerned, we assessed the classroom situation as *enabling* (Table 1).

#### Suggestion of an alternative

The analysis found that focus on metacognition and pupil's exploration was missing in the lesson. It is obvious from the lesson transcript that pupils had problems identifying the cause of the pressure which is essential to the theme of the fronts. We believe that teacher's questions could be adjusted to allow more space for metacognition, e.g. in this way:

- Justify why cold air cannot go up?
- Justify why warm air cannot go down?
- How is precipitation created?
- How did you figure out that cold air will squeeze under the warm air?

Questions should be focused on comparing warm and cold front intensively which would support pupil's exploration. The teacher could divide pupils into groups and project both pictures together. Pupils could then try to describe differences between warm and cold front and realize these differences. The teacher could prepare a simple table (Table 2) which focuses on comparing warm and cold front with regard to (a) what happens during front's movement, (b) speed of the front, (c) which type of precipitation it brings and (d) the influence of the pressure. Pupils could fill in the table in groups and confront their solutions. The table could be used as a form of lesson notes.

Table 2  
Suggestion of the table for comparing warm and cold front

Front	What happens during movement of the front?	Speed (slow x fast)	Precipitation (lasting x strong rain showers)	Pressure (low x high)
Warm				
Cold				

#### Reconsideration of an alternative

Presented classroom situation was evaluated as *enabling*. An alternative was suggested to support metacognition and pupil's exploration. The goal of the classroom situation was preserved. Suggested alteration could be problematic compared to the original version because of the time demand in the lesson.

#### Conclusion

The alternative we suggested could be helpful for a change for the better in the way how teachers (a) compose learning tasks, (b) lead pupils to solutions and (c) provide pupils with feedback for successful and motivating learning. We presume AAA methodology could contribute to optimization of classroom situations from the perspective of *learning to learn* and instructional quality.

#### Literature

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