Factors of positive emotional atmosphere

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Factors of Positive Emotional Atmosphere – Case Study of one Primary School Classroom
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INTRODUCTION
A large body of research indicates the importance of affective elements in mathematical problem-solving (e.g. Schoenfeld, 1985; Goldin, Epstein, Schorr & Warner, 2011) and it seems that positive emotions facilitate the creative aspects of problem-solving (Pekrun & Stephens, 2010). In a three-year research project concerning problem-solving and its teaching and learning, primary school pupils’ drawings about mathematics lessons were collected in one of the background studies. Based on the drawings, the emotional atmosphere was mainly positive in the third grade classrooms and in the fifth grade the atmosphere was more negative, although there were large differences between classrooms (Laine, Näveri, Ahtee, Hannula, & Pehkonen, 2013; Laine, Ahtee, Näveri, Pehkonen, Portaankorva-Koivisto, & Tuohilampi, 2015). According to many national and international studies students’ mathematical self-efficacy and enjoyment of mathematics decrease over the course of comprehensive education (Metsämuuronen & Tuohilampi, 2014; Lee, 2009; Sjøberg & Schreiner, 2010). However, in our research the differences between the classes were large in both in third and fifth grade. Therefore, we wanted to determine what kind of teachers’ actions support the development of a positive attitude among pupils.

The collective emotional atmosphere in a classroom
Evans, Harvey, Bucley & Yan (2009) divided the notion of classroom atmosphere into three complementary components: 1) academic, 2) management, and 3) emotional. In this study we concentrate on the third component, i.e., emotional atmosphere, which refers to the affective interactions within the classroom.

The emotional atmosphere within the classroom can be regarded either from the viewpoint of individuals in the class or from the viewpoint of the classroom as a whole. The individual level looks at the individual experiences that occur in the class, whereas the classroom level looks at the class in terms of social interaction, communication and norms. Furthermore, a distinction can be made between two temporal aspects of “affect”: state and trait. State refers to the emotional atmosphere at a specific moment in the class while trait refers to more long-term conditions. (Hannula, 2011).
<table>
<thead>
<tr>
<th></th>
<th>The level of an individual</th>
<th>The level of a classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State</strong></td>
<td>Emotions and emotional</td>
<td>Social interaction</td>
</tr>
<tr>
<td>affective</td>
<td>reactions</td>
<td>Communication</td>
</tr>
<tr>
<td>condition</td>
<td>Thoughts</td>
<td>Atmosphere in a classroom (momentarily)</td>
</tr>
<tr>
<td></td>
<td>Meanings</td>
<td></td>
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<tr>
<td></td>
<td>Goals</td>
<td></td>
</tr>
<tr>
<td><strong>Trait</strong></td>
<td>Attitudes</td>
<td>Norms</td>
</tr>
<tr>
<td>affective</td>
<td>Beliefs</td>
<td>Social structures</td>
</tr>
<tr>
<td>property</td>
<td>Values</td>
<td>Atmosphere in a classroom</td>
</tr>
<tr>
<td></td>
<td>Motivational orientations</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1: Dimensions of the emotional atmosphere in a classroom (see Hannula, 2011)*

In Table 1 different affective dimensions forming the emotional atmosphere in a classroom are shown using the level of a pupil and the level of community i.e. of a classroom. As an example one can think about the situation when the homework is being checked in the beginning of a mathematics lesson. This situation can differ quite a lot in different classrooms. In one classroom pupils are working in pairs and the atmosphere – as seen through the emotional tone of communication – is jovial. In another classroom the teacher is walking around and s/he criticizes the pupils who have not done their homework. S/he also appoints certain pupils to present their solutions on the blackboard. The emotional tone of the social interaction, or the atmosphere, for this classroom is one of control and criticism. (Laine et al., 2013).

The collective concepts are not just a collection of the beliefs and conceptions of individuals (Cobb & Yackel, 1996). These, like norms, are formed in joint action (e.g. Blumer, 1986). One student’s interpretation of her emotional state and that of others in the classroom also somehow shows her interpretation of the collective experience in the classroom. If these interpretations of all students in the classroom are put together, the result could describe the joint action, and in the long run the collective emotional atmosphere of the classroom.

Hence, teachers have a central role in advancing social interaction and a positive atmosphere in their classes. The emotional relationship between the teacher and pupils affect a classroom’s emotional atmosphere (Evans et al., 2009). Harrison, Clarke, and Ungerer (2007) summarized that a positive teacher-pupil relation advances both pupils’ social accommodation and their orientation to school. Several studies have found a close connection between the atmosphere in the classroom and emotional and social experiences (e.g. Frenzel, Pekrun, & Goetz, 2007).
In the classroom, interaction occurs between teacher and pupils, and between pupils themselves. The relations between the teacher and the pupils and between the pupils themselves, as well as the rules and the ways of working in the classroom, have an effect on this interaction and also on its openness (Newman, 2002,).

**Drawings as a research method**

Drawings belong to image-based research methods (Thomson, 2008). They can express things not easily verbalized. White, Bushin, Carpena-Méndez, and Ni Laoire (2010) found that visual methods are effective not simply because of the amount of data produced but also because of the quality of the data providing glimpses and insights into the everyday lives of children. Also, children’s viewpoints are better discerned from their drawings than through other data collection methods (Harrison et al., 2007).

Kearney and Hyle (2004) found that participant-produced drawings appear to create a path toward participant feelings and emotions, making them viable tools for researchers who seek access to this type of data, and lead to a more succinct presentation of participant experiences. Altogether, their findings further establish that drawings are an important source of data especially when the drawers’ feelings and experiences are examined.

**THE PURPOSE OF THE STUDY**

It is well known that pupils attitudes toward mathematics and therefore also the emotional atmosphere generally becomes more negative as pupils get older (e.g. Metsämuuronen & Tuohilampi, 2014). Based on our data on emotional atmosphere in the third and fifth grades (Laine et al., 2013; 2015), we found that the emotional atmosphere had become clearly more positive in one of the classes. Therefore we wanted to look at the teacher’s and the pupils’ behaviour in this class in order to identify factors that could explain why the emotional atmosphere had become more positive. Thus our research question was as follows: Which factors in the teacher’s and the pupils’ behaviour in the mathematics lessons could explain positive changes in the emotional atmosphere from the third to fifth grade?

**METHODOLOGY**

The data are based on third and fifth graders’ drawings collected at the beginning of the 2010 autumn term and at the end of the 2013 spring term in Finland (Helsinki area). The pupils performed the drawing task during their mathematics lessons under the supervision of their teacher. The task for the pupils was as follows: “Draw your teaching group, your teacher and the pupils, in a mathematics lesson. Use speaking and thinking bubbles to describe discussion and thinking.
And show yourself as ‘me’ in your drawing.” Speaking and thinking bubbles were subsequently used in about two-thirds of the drawings.

We have earlier published our findings on the distribution of collective emotional atmosphere during third grade mathematics lessons in the classes of nine teachers, and during fifth grade lessons in the classes of eight teachers, based on a summary of the holistic evaluation of the individual pupils’ drawings (Laine et al., 2013; Laine et al., 2015). From these data we chose one class.

The evaluation of classroom emotional atmosphere was based on all pupils’ and teacher’s visible moods as well as their speech and thought bubbles in the drawings. The pupils’ and the teacher’s moods were determined by the form of the mouth (smiling, neutral, sad/angry, not visible). The nature of the speech and thought bubbles was classified into three subcategories: positive (e.g. “Mathematics is fun”), negative (e.g. “Mathematics is hard”) and neutral (e.g. “Four times four is sixteen”). The classroom emotional atmosphere was therefore composed of three possibilities described in the pupils’ drawings: 1) It is positive when all the drawn pupils and the teacher smile and/or think positively, some can be neutral; 2) It is negative when all the drawn persons are sad or angry or think negatively, some can be neutral; 3) It is other. The other category contains several options. It is ambivalent containing both positive and negative elements, neutral containing only neutral facial or other expressions or unidentifiable when it is impossible to see any facial or other expressions. Examples of the analyses can be found in Laine et al. 2013 and Laine et al. 2015.

To determine the factors in the teachers’ and pupils’ behaviour that could explain changes in the emotional atmosphere from the third to the fifth grade, we concentrated on one class in which the atmosphere was positive. Our research method can be described as phenomenographic because we were looking at a child’s conception of a phenomenon, i.e. a pupil’s image of mathematics lessons, and then forming larger categories that describe different image groups (Marton, 1986). All drawings were examined many times in order to find common factors. We identified the following three factors in the pupils’ activities: pupils asking for help, pupils sitting together, and pupils talking to each other about mathematics. In the teachers’ activities we found three possible explaining factors related to teacher-pupil interaction: the teacher was located close to her pupils, the teacher was helping or encouraging the pupils, and the teacher was praising the pupils.

RESULTS

We have earlier published the distribution of collective emotional atmosphere during third and fifth grade mathematics lessons (Laine et al. 2013, Laine et al. 2015). From these data we chose one teacher Claire. Table 2 shows the percentages of the pupils in Claire’s class in whose drawings the emotional
atmosphere has been classified as positive, negative or other in third and fifth grade.

<table>
<thead>
<tr>
<th>3rd grade</th>
<th>5th grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>positive</td>
<td>47% (9)</td>
</tr>
<tr>
<td>negative</td>
<td>11% (2)</td>
</tr>
<tr>
<td>other</td>
<td>42% (8)</td>
</tr>
</tbody>
</table>

Table 2. The distribution of the emotional atmosphere in the third grade and fifth grade.

Claire’s class is very positive both in third and fifth grade. In the third grade almost half of the pupils described the atmosphere as positive and only two of them as negative. In the fifth grade no pupil had any longer described the atmosphere as negative, and more than half of the pupils (58%) had drawn it as positive.

In the pupils’ drawings from third and fifth grade classes we looked for positive features that could explain the changes in the classroom emotional atmosphere. Table 4 shows the number of pupils whose drawings contained each factor in the three pupil activities: pupils are asking for help from the teacher or from their classmates, pupils are sitting together, and pupils are talking to each other about mathematics. Table 3 also includes the number of pupils whose drawings contained the three teacher activities: the teacher is located close to the pupils, the teacher is helping or encouraging the pupils and the teacher is praising the pupils.

<table>
<thead>
<tr>
<th>Number of pupils</th>
<th>Pupils are asking for help</th>
<th>Pupils are sitting together</th>
<th>Pupils are talking about mathematics</th>
<th>Teacher is close to the pupils</th>
<th>Teacher is helping or encouraging</th>
<th>Teacher is praising</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3rd grade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>15</td>
<td>16</td>
<td>9</td>
<td>6</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>79%</td>
<td>84%</td>
<td>47%</td>
<td>32%</td>
<td>32%</td>
<td>11%</td>
</tr>
<tr>
<td><strong>5th grade</strong></td>
<td>19</td>
<td>15</td>
<td>10</td>
<td>8</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>53%</td>
<td>79%</td>
<td>53%</td>
<td>42%</td>
<td>37%</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

Table 3. The distribution of the possible explaining factors.

When examining the pupils’ drawings, most striking in Claire’s classes was that more than half of the pupils had drawn something about asking help either generally, like “Could somebody help me?” specifically from the teacher, like
“Teacher! I need help.”, or from classmates, like “Could you help me?” (see Figure 1 from third grade). These requests were responded positively, like “I will help you!” or “Of course”. The pupils also revealed in their speech bubbles when they could not do something or when the task was difficult for them, in expressions like “I have no idea what to do”, “I cannot do it”, or “I didn’t understand”. Also, in these cases other pupils were offering their help even when it was not specifically asked.

Figure 1. The teacher, Claire, is located on the left in front of her desk. She says: “If Maija has 86 euros and Rosa 12 euros. How much money have they together?” Pupils are sitting in a group. Pupil sitting down left says: “Otto, can you help me?” The pupil in front of him answers: “Yes, I’ll help you.” There is a dashed line indicating that the pupil is moving to help the other. The pupil in front of the teacher is saying: “I need help.” There is one pupil standing near the table saying: “I’ll help you.”

The pupils also described how they were sitting in their classrooms. Four drawings depicted the pupils sitting alone, in all the others the pupils were sitting in pairs or in groups. The videos made during the research project showed the pupils sitting in groups in the third, fourth, and fifth grades.

In Claire’s class there were drawings in which the pupils talked about mathematics with each other in both the third and fifth grade (see Figure 2 from fifth grade). Many third graders wrote at the back of their drawings that they were allowed to talk about mathematics during the lesson. One girl wrote about the lesson like this: “We don’t just sit during our mathematics lessons. We also talk mathematics. We also help each other. We can walk to others to help them. We are happy about that.”
Figure 2. The drawer (Minä) is sitting in upper left corner of the drawing. She has written between the pupils: “We are talking about mathematics and working together.” The pupil under her is saying: “Can you help me?” and the other pupil answers: “Of course.” The pupil sitting alone says: “I didn’t understand.” The arrow goes to a bubble: “The pupil asks help from his friend but the friend can’t help.” The following arrow indicates that Claire (the teacher) comes to help him. An important part of a teacher’s activity is how she communicates with her pupils. This was first examined by looking at the teacher’s location in the classroom. In Claire’s fifth grade class, 42% of the pupils had drawn the teacher positioned among the pupils. She was shown as helping or encouraging them with words like “Carry on, make it a bit clearer”, going to help them, or pupils had gone to her for help. One picture showed Claire standing in front of the class, and asking “Does anyone need help?” However, only one picture shows Claire praising a pupil while standing beside him, saying “Very good Thomas. That is quite correct.”

DISCUSSION

A Finnish longitudinal study found that pupils’ attitude towards mathematics decreased over the course of comprehensive education (Tuohilampi & Metsämuuronen, 2014). This is alarming because these attitudes influence how the pupils will later respond to mathematics in their studies. Therefore, it is important to determine the factors that may change such attitude. We approached this many-sided problem by looking at pupils’ drawings to see how the classroom emotional atmosphere had changed from the third to fifth grade.
Interaction between the pupils seems to be of crucial importance. An open and tolerant atmosphere is projected from the drawings of classrooms with a positive emotional atmosphere. The pupils are talking about mathematics and advising each other. Therefore the atmosphere in the classroom is such that learning is appreciated and it allows the pupils to show their own incomprehension or lack of knowledge by freely asking (Ryan, Gheen, & Midgley, 1998, 533–534). The teacher has a central role in constructing the emotional atmosphere during mathematics lessons (Evans et al., 2009; Harrison et al., 2007). Teachers’ views of mathematics, their stance towards pupils, their pedagogical skills, etc., affect the quality of their interaction with the pupils and thus also the emotional atmosphere. In particular, the emotional relationship between the teacher and the pupils, the teacher’s awareness of pupils’ feelings and the reasons for them, the teacher’s skill in evaluating and responding to pupils’ feelings, the teacher’s conception of the importance of different emotions in learning, and the teacher’s emotional interpersonal guidelines all affect the emotional atmosphere (Evans et al., 2009).

When the reliability of this study is examined, one must particularly consider why the pupils in the same class drew different pictures of the emotional atmosphere. This is probably because pupil’s affective conditions and properties affect how they interpret different situations during mathematics lessons (Hannula, 2011). Therefore, it would be interesting to look at whether the emotional atmosphere is also the same in the lessons of other subjects; in other words, whether the emotional atmosphere described here especially pertains to the situation during mathematics lessons or does it also describe the situation in the classroom in general.

The reliability of this study has been given consideration in many ways. The pupils drew their pictures for the researchers and not for their teacher. This means that the pupils could draw without paying attention to the teacher’s reaction. The authors analyzed together all the drawings, discussing and negotiating each. Most (more than 95%) of the drawings were fairly unambiguous, and it was easy and univocal to pick out things for analysis, like pupils asking for help, pupils talking about mathematics, and pupils sitting alone. However, there were difficulties with some of the drawings that contained a large amount of information. We showed the results of this article to the researcher who had followed the activities in this classroom once a month for three years. The results were in harmony with her perception. The close link between the drawings and the actual situation in the classroom further confirms that drawings are a good research method for gathering pupils’ ideas (see Dahlgren & Sumpter, 2010; Pehkonen, Ahtee, & Laine, 2016).

It seems that open and confidential interaction between the teacher and his/her pupils as well as between the pupils themselves is necessary for a positive emotional atmosphere in the classroom. Therefore it would be worth studying
how such an atmosphere, including the kind of interaction evident in the drawings analyzed in this study, could be created. What means do teachers use to achieve a good teacher-pupil relationship as well as a confidential relationship between pupils? Furthermore, it would be interesting to study how the emotional atmosphere in the classroom affects the pupils’ learning.

References


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