ATTITUDES OF SEVENTH AND EIGHTH GRADE STUDENTS TOWARD INTEGRATING HUMOR IN MATH LESSONS

Avikam Gazit
Hemdat-Hadaram College of Education Kibbutzim College of Education (ISRAEL)

Abstract
The aim of this paper is to present a study which investigates the attitudes of junior high school students towards integrating humor into math class. The results were compared to a previous study (Gazit, 2013) which checked the attitudes of pre-service math teachers.

Mathematics and humor are not perceived as being in line with each other. Integrating humor brings about a more pleasant atmosphere and reduces anxieties. It can promote motivation and interests as well as promote creativity of students.

A sample of seventh and eighth students answered a questionnaire. The results show that most students do not agree that humor and mathematics can't go together and they agree it is important to put humor into math lessons. A large part of the students agree on the benefits of humor: improving communication, atmosphere, thinking, creativity as well as reducing boredom. Most students also do not agree that humor can harm math lesson or dishonor the teacher. Eighth grade students showed more support than seventh grade students, but less than preschool math teachers. It is recommended that math teachers introduce an element of humor into their math lessons.

1 THEORETICAL BACKGROUND
When, if ever, did you have an opportunity to smile during a mathematics class? The mathematician Littlewood (Littlewood, 1953) wrote that one good mathematical joke was preferable, and it contained more mathematics than a dozen medium level articles. Littlewood, in the word Joke perhaps meant also a puzzle, which presents a challenge that is presented for fun, and raises a smile and sometimes has an element of humor, or a situation that seems illogical, with which to contend. Russel wrote (Monk, 2000) that mathematics deals with esoteric content that is not understood, and if it is already understood, then we are not sure that it is true… there are other mathematicians who have a sense of humor, as for example, the Jewish – Hungarian mathematician Paul Ardosh. He drank a great deal of coffee in order to stay awake. He said that a mathematician is a machine that changes coffee into mathematical sentences… (Hofman, 2000). Humor plays an important part in the process of inter – personal communication within groups of different affiliations. A sense of humor is viewed as a component for evaluating popularity, and teenagers with a sense of humor are considered as having a higher level of social standing (McGee & Shelvin, 2009). According to Freud (Freud, 1960), humor provides non - threatening relationships in the context of sex or aggression. Likewise, humor releases stress and prevents pressurized situations. The use of humor is viewed as signifying a positive mood, decline in states of anxiety, and depression, and improvement in the cognitive ability (Herzog & Strevey, 2008).

Studies have shown that the use of humor is one of the criteria by which pupils identified the image of a good teacher. Humor also has the potential to improve the teaching process and to make the teacher appear more human and less threatening (Torok, McMorris & Lin, 2004). In the study made by Ford, Ford, Boxer and Armstrong (Ford, Ford, Boxer & Armstrong, 2012), pupils were exposed to humorous caricatures before an examination in mathematics, and compared to pupils who were exposed to non - humorous lessons or with no preliminary exposure, and the achievements of the experimental group were higher. The researchers’ explanations emphasize the reduction in anxiety before the examination following exposure to the caricatures. Pupils with high results in mathematics to not need encouragement through humor and they have internal motivation, but pupils with difficulties in mathematics need a lever that promotes motivation. Humor is suitable for such pupils. Grawe (Grawe, 2016) emphasizes that the use of humor that relates to the curriculum may be useful in teaching mathematics to pupils who do not specialize in mathematics.

In conclusion, it should be emphasized that the positive features of humor, such as, removal of barriers, increase in attention, improvement in the cognitive process and creativity, also lead to an improvement in self - image, both of the teacher and of the student. Humor creates a more pleasant
atmosphere in the classroom, reduces anxiety and can promote motivation and interest in mathematics – one of the aims of teaching.

The purpose of the study is to examine the attitudes of seventh and eighth graders toward the introduction of humor in teaching mathematics and to compare their attitudes to those of pre-service teachers as shown by Gazit's study (Gazit, 2013).

2 METHODOLOGY

2.1 The research questions

1. What are the attitudes of seventh and eighth graders toward integrating humor in teaching mathematics?

2. What is the difference between the attitudes of seventh and eighth graders compared with the attitudes of pre-service teachers specializing in the teaching of mathematics in elementary schools?

2.2 The research population

71 students - 35 seventh grade, 36 eighth grade from a junior high school in the center of Israel, who learn mathematics with the same teacher.

2.3 Research tools

A questionnaire with 20 items relating to the different aspects of the use of humor in the teaching of mathematics, based on the Gazit's questionnaire (Gazit, 2013) with changes in 3 items in order to adapt them to the students. Grading of the items are according to Lickert's scale of 1 – 5.

3 RESULTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Grade</th>
<th>Agree Highly 5</th>
<th>Agree 4</th>
<th>No attitude 3</th>
<th>Do not agree 2</th>
<th>Do not agree at all 1</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no place for integrating</td>
<td>7th</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>17</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>22</td>
<td>1.6</td>
</tr>
<tr>
<td>Reduces anxiety</td>
<td>7th</td>
<td>13</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>14</td>
<td>12</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td>No respect towards the teacher</td>
<td>7th</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>11</td>
<td>13</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>23</td>
<td>1.6</td>
</tr>
<tr>
<td>Serious atmosphere</td>
<td>7th</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td>Nature of Mathematics</td>
<td>7th</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>9</td>
<td>16</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>9</td>
<td>21</td>
<td>1.6</td>
</tr>
<tr>
<td>Equality with the teacher</td>
<td>7th</td>
<td>7</td>
<td>12</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>8</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>2.8</td>
</tr>
<tr>
<td>Improves the atmosphere</td>
<td>7th</td>
<td>30</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>25</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>4.4</td>
</tr>
<tr>
<td>Forbidden to use</td>
<td>7th</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>27</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>31</td>
<td>1.2</td>
</tr>
<tr>
<td>Improves communication</td>
<td>7th</td>
<td>13</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td>0</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>20</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Table 1. Distribution of responses to the various items and average
(7th grade: N=35; 8th grade: N =36)
Effective teaching | 7th | 8th | 9 | 14 | 2 | 1 | 3 | 4.1
| Encourages thinking | 7th | 8th | 11 | 7 | 5 | 2 | 3.5
| Creates disturbance | 7th | 8th | 4 | 14 | 9 | 2 | 2.8
| Removes distance | 7th | 8th | 5 | 3 | 14 | 9 | 2.6
| Non serious reference | 7th | 8th | 2 | 7 | 7 | 11 | 2.5
| Removes boredom | 7th | 8th | 17 | 3 | 3 | 0 | 2.2
| Improves creativity | 7th | 8th | 16 | 6 | 1 | 3 | 3.9
| Important to integrate | 7th | 8th | 14 | 4 | 5 | 3 | 3.6
| Doesn't seem to me that there is a place for it | 7th | 8th | 4 | 3 | 3 | 20 | 2.0
| Improves the image of the teacher | 7th | 8th | 9 | 8 | 5 | 4 | 3.4
| To integrate jokes | 7th | 8th | 15 | 8 | 7 | 1 | 3.7

The items relate to five categories:

a) The nature of mathematics (items 4,5)
b) Attitude toward integrating humor (items 1,8,17,18,20)
c) The benefits of integrating humor (items 2,6,7,10,11,15)
d) The disadvantages of integrating humor (items 12,14)
e) Status of the teacher and the attitude towards him (items 3,6,13,19)

4 ANALYSIS OF THE AVERAGES

4.1 The Nature of Mathematics

<table>
<thead>
<tr>
<th>Average:</th>
<th>7th Grade students</th>
<th>8th Grade students</th>
<th>Pre-service teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics classes are characterized by a too serious atmosphere</td>
<td>3.4</td>
<td>3.6</td>
<td>4.1</td>
</tr>
<tr>
<td>The nature of Mathematics lessons does not facilitate the use of humor</td>
<td>2.0</td>
<td>1.6</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Nearly half the 7th graders (48%) and less than half the 8th graders (44%) agreed that mathematics lessons are too serious with an average 3.4, and 3.6 respectively. The pre-service teachers, displayed a higher degree of agreement to this – 81% with an average of 4.1.

Regarding the nature of mathematics that does not facilitate the use of humor, the majority of 7th grade pupils (71%), as also the majority of eighth graders (85%) disagreed with this, with an average of 2.0, and 1.6 respectively. Among the pre-service teachers 93% expressed disagreement with the statement.
4.2 Attitudes towards integrating humor in the teaching of Mathematics

The majority of 7th grade pupils (68%), as also the majority of eighth graders (83%), did not agree that there is no place for integrating humor into the teaching of mathematics. Nearly all the pre-service teachers did not agree with this statement. For a similar statement, with a more personal tone in the text: "I don't think so..." a similar percentage of the 7th and 8th graders did not agree, 67% of 7th graders and 83% of 8th graders. The 7th and 8th graders showed a high degree of disagreement to the statement than the pre-service teachers. For the statement: "The teacher is forbidden to use humor in mathematics lessons", 86% of 7th graders and 94% of 8th graders did not agree. Pre-service teachers showed almost overall agreement with an average of 1.2.

The two statements with a positive text related to the importance of integrating humor and jokes in mathematics lessons. The majority of 7th graders (65%) and of 8th graders (81%) agreed with the importance of introducing humor into mathematics classes. Nearly all the pre-service teachers (94%) agreed to introduce humor into mathematics classes. When the term "humor" was replaced with "jokes" the degree of consent by 7th graders decreased – about half (54%), while with the 8th graders there was still a smaller majority – 74%. With the pre-service teachers there was a decline in the degree of agreement when referring to the integrating of jokes – 75%.

4.3 Benefits of introducing humor into mathematics lessons

A little over half of the 7th graders (57%) and the majority of the 8th graders (74%) agreed that integrating humor may reduce anxiety. Most of the pre-service teachers (87%) agreed with this statement.

Most of the 7th graders (91%) and 8th graders (83%) agreed that integrating humor into mathematics lessons may improve the atmosphere. The pre-service teachers displayed overall consensus (100%).

Most of the 7th graders (69%) and 8th graders (83%) agreed that integrating humor into mathematics lessons may improve communication in the classroom. Most of the pre-service teachers (83%) also agreed with this statement.

Only half of the 7th graders agreed that integrating humor may contribute to effective teaching while the majority of the 8th graders (83%) agreed to this statement. Most of the pre-service teachers (81%) agreed with this statement.

Over half of the 7th graders (59%) and the majority of 8th graders (83%) agreed that integrating humor may encourage thinking. Most of the pre-service teachers (84%) agreed with this statement.

Most of the 7th graders (83%) and 8th graders (75%) agreed that integrating humor may reduce boredom in mathematics lessons.
Most of the 7th graders (71%) and 8th graders (77%) agreed that integrating humor may improve creativity. Nearly all the pre-service teachers (97%) agreed that with this statement.

### 4.4 Disadvantages of integrating humor in mathematics lessons

<table>
<thead>
<tr>
<th></th>
<th>7th Grade students</th>
<th>8th Grade students</th>
<th>pre-service teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>May create disturbance in the lesson</td>
<td>2.8</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>May lead to a non-serious attitude</td>
<td>2.5</td>
<td>1.9</td>
<td>2.0</td>
</tr>
</tbody>
</table>

7th graders, and to a certain extent also 8th graders, are divided on the creation of disturbances in the lesson: 40% of the 7th grader did not agree with this statement but 20% did agree, while 40% did not offer a position either way. On the other hand over half of 8th grader (53%) did not agree with this statement but the percentage of those agreeing was very similar-19%, with 25% abstaining. Among the pre-service teachers there was a higher percentage of abstentions – half of the participants, and similar to the 7th graders, 41% did not agree on the matter of the disturbance that humor might create. Only 9% agreed to this statement.

With regard to a non-serious attitude toward the lesson over half of the 7th graders did not agree (54%) while the majority of 8th graders (77%) did not agree with this statement with an average 2.5,1.9 respectively where a quarter of the 7th graders agreed that integrating humor may lead to a non-serious attitude while in the 8th grade only 2 students agreed. Most of the pre-service teachers – 75% did not agree with this statement with an average of 2.0 and only 4 participants did not agree.

### 4.5 The teacher's status and the attitude towards him

<table>
<thead>
<tr>
<th></th>
<th>7th Grade students</th>
<th>8th Grade students</th>
<th>pre-service teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>May lead to disrespect towards the teacher</td>
<td>2.2</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>May create equality between the teacher and the student</td>
<td>3.4</td>
<td>2.8</td>
<td>2.6</td>
</tr>
<tr>
<td>May remove the distance between the teacher and the student</td>
<td>2.5</td>
<td>3.0</td>
<td>2.8</td>
</tr>
<tr>
<td>May improve the teacher's image</td>
<td>3.4</td>
<td>3.4</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Most of the 7th graders (69%) and the 8th graders (81%) did not agree that integrating of humor into mathematics lessons may lead to disrespect towards the teacher. Also most of the pre-service teachers (88%) did not agree with this statement.

The next statement, on humor creating equality between the teacher and the student does not have a negative or positive aspect despite the students being able to interpret this as a cancellation of the teacher's authority. Just over half the 7th graders (54%) and only 31% of the 8th graders agreed that the introduction of humor creates equality between the student and the teacher. Only 23% of pre-service teachers agreed with this statement.

The next statement on the cancellation of the distance between the teacher and the student is very similar to the statement on equality. Only 27% of the 7th graders, and almost half the 8th graders (46%) agreed to this statement. 31% of the pre-service teachers agreed.

The last statement in this category relates to the image of the teacher who introduces humor, in the eyes of the students. Half the 7th graders and close to half the eighth graders (46%) agreed that integrating humor into the mathematics lesson improves the teacher’s image. The pre-service teachers were asked if humor improves the teacher's self – image and over half (56%) agreed.

### 5 DISCUSSION AND CONCLUSIONS

The first research question related to the attitudes of 7th and 8th graders, towards integrating humor into mathematics lessons. A summary of the responses to the questionnaire presents a positive picture of accepting humor as a means of improving teaching's different aspects with support for introducing humor into mathematics lessons. Most of the students also do not agree that the use of humor creates a lack of respect towards the teacher but are divided on the possibility that the introduction of humor may lead to negative behavior. In a study conducted amongst 7th graders,
The second category related to the attitude towards integrating humor in the teaching of mathematics. In a study conducted on college students the influence of the use of humor by the teacher was studied (Goodboy, Booth-Butterfield, Bolkan, & Griffin, 2015), it was found that the use of humor predicts an effort investment in learning, participation in the lesson, and communication outside the classroom. Most of the students agree that integrating humor contributes towards an improvement in atmosphere, communication, creativity, thinking and effective teaching. Herzog and Starvey, (Herzog & Starvey, 2008) emphasize integrating of humor into teaching as a means of improving cognitive ability. Most of the students, although, with a smaller majority, also agreed that integrating of humor may reduce boredom as well as reducing anxiety. The study of Ford and his colleagues, (Ford, Ford, Boxer & Armstrong, 2012) relates to humor as reducing anxiety in mathematics lessons, but they are divided on the possibility that integrating humor creates disturbances in a lesson. Just below half the pupils did not agree – 47% compared to 21% who did agree. At the same time there was a relative high percentage of abstentions -34%. This distribution is evidence, in a certain way, of the conflict, perhaps resulting from the attitude to humor between friends or to humor on the television. The majority of students disagreed with the possibility that integrating humor into mathematics lessons would lead to a non-serious attitude. In a study by Sideling (Sidelinger, 2014) it was found that the use of humor by the teacher overcomes student's negative attitude and reduces the disturbing behavior. Another study found that the use of humor by the teacher successfully prevents disturbance in the classroom, such as unreasonable discussions (LaBelle, Booth-Butterfield, & Weber, 2013).

The last category related to the teacher and possible influence on him, of the introduction of humor into mathematics lessons. Most of the pupils did not agree that the introduction of humor creates lack of respect towards the teacher. Regarding the statement relating to the creation of equality between the teacher and the pupil, there were conflicting opinions where 40% of the pupils agreed and 37% disagreed. To a similar statement regarding the removal of the distance between the teacher and the pupils, the percentage among the pupils of those agreeing was smaller than for the previous statement – 37%, and the percentage of those disagreeing was slightly higher – 41%. The fourth statement in this category relates to the improvement in the teacher's image in the eyes of the pupil when humor is introduced. Close to half the pupils – 48%, agreed with this statement. Studies show that humor is used as one of the characteristics of the good teacher's image, (Torok, McMorris, & Lin, 2004)

The second research question related to the difference between the attitudes of the students compared to that of the pre-service teachers (Gazit 2013). Almost half the students agreed that mathematics lessons are typified by having a too serious atmosphere as compared to most of the trainee teachers (81%) who agreed with this statement. It is possible to relate to the difference in the pre-service teachers' response to the degree of seriousness of the training process. Also in the practical classroom work it is impossible to make fun of the profession they chose to study... most of the students did not agree that the nature of mathematics does not allow integrating of humor as compared to an almost complete majority of the pre-service teachers. 8th graders displayed a higher average closer to that of the pre-service teachers – 86%. Actually most of the pre-service teachers who agreed to the seriousness of the profession did not agree that the nature of the subject they teach does not allow integrating of humor.

The second category related to the attitude towards integrating humor in the teaching of mathematics. To the statement "there is no place for the introduction of humor..." 76% of the students did not agree compared to an absolute majority of 97% among the pre-service teachers. The next statement relates to the teacher:" The teacher is forbidden to use humor in mathematics lessons". Most of the students – 90% did not agree. Among the pre-service teachers there was complete disagreement. To the statement: "It is important to introduce humor into mathematics lessons", 73% of the students agreed whereas a quarter of the 7th grader did not agree. The pre-service teachers were asked a more personal question: "I will introduce an element of humor..." to which there was an almost complete overall agreement -94%. The statement which centers on a certain type of humor: introduction of jokes has 64% of the students' agreement. The pre-service teachers were asked: "I will introduce jokes..." and the percentage of agreement was lower than for the statement on introduction of humor generally -75%. In this category it is possible to see that the pre-service teachers express a higher degree of disagreement in regard to ruling out the possibility of combining humor, and higher percentages of agreement for combining humor and jokes, than those of 7th and 8th graders. The
attitudes of the 8th graders were closer to the that of the pre-service teachers. In an article presenting an approach of teaching mathematics to students for whom mathematics is not their first specialty (Grawe, 2016), the author proposes, to combine the integration of humor along with the style of thinking, enthusiasm and involvement.

The third category related to the benefits of introducing humor. The percentages of agreement to the seven benefits ranged from 67% for the students – encourage thinking and the possibility of effective teaching up to 87% - improving atmosphere. For the pre-service teachers the percentages were higher and ranged from 81% - the possibility of effective teaching, up to 87% - improving the atmosphere. This benefit was found at the head of the students for both groups and is supported by other studies (Zamir 2007, Wagner &Urios-Aparisi, 2011).

After the benefits comes the category of disadvantages of introducing humor and in which there are two statements, where the first relates to possible disturbance in the lesson. 7th and 8th graders were much divided on this: although almost half (46%) did not agree with the statement, 21% did agree and the rest abstained. Half of the pre-service teachers abstained from expressing a view, and the percentage of disagreement was very similar to that of the students – 41%. The second statement expresses the possible influence of integrating humor on the students' reference to mathematics lessons: non serious. Two thirds of the students, and most of the pre-service teachers -75% did not agree to the statement.

The last category relates to the influence of introducing humor on the relationship with the teacher. The first question expresses the possibility of lack of respect for the teacher. Although most of the 7th and 8th graders – 76% did not agree to the statement, as compared to a higher percentage of trainee teachers – 88% who have still not had an independent classroom experience. The next two statements relate to the creation of equality between the teacher and the pupil and removal of the distance between them. In regard to equality between teacher and pupil there are differences of opinion whereby 42% of the pupils agreed and 37% did not agree compared to a slightly opposite situation with the trainee teachers where half did not agree and only 22% agreed. To the statement on removal of the distance between teacher and pupil which has a greater degree of change in status quo, there are also differences of opinion, both among the pupils and the trainee teachers. 41% of the pupils disagreed and 37% agreed. Among the trainee teachers 37% disagreed and 31% agreed. This situation shows the dilemma regarding the definition of equality and distance between teacher and pupil – There is ambiguity in the definition of this condition. The last statement in this category relates to the improvement in the teacher's image in the eyes of the pupils, and close to half of them agreed with this statement. The trainee teachers were asked on the improvement in the teacher's self-esteem and over half agreed. There is similar agreement between the pupils and the trainee teachers regarding the teacher's image where the percentage agreeing is higher than that of those disagreeing. This influence is reinforced in studies that show that the use of humor is one of the criteria in which pupils identified the image of a good teacher. Humor also has a potential to transform the teacher into being more human and less threatening (Torok, McMorris& Lin, 2004).

An important conclusion that can be drawn from the findings of this pioneering study is that among the 7th and 8th grade pupils there are positive attitudes toward introducing humor into mathematics lessons. These attitudes, together with the positive attitudes of the pre-service teachers indicate the need to emphasize and to reinforce the introduction of humor into the training of teachers of mathematics, and in advanced teachers' courses. It is recommended to find the way to introduce humor into math curriculum. I'll finish with the words of Bonjour (Bonjour, 2011) that emphasizes the importance of humor as one of the components of good teaching. She claims humor allows attention and interest in the lesson and adds taste and color to the lesson like spices to food.

REFERENCES


