

Pre service Mathematics Teachers' Attitudes Toward Integrating Humor in Math Lessons

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Abstract

The aim of this paper is to present a study which investigates the attitudes of elementary mathematics pre-service teachers toward integration elements of humor in math teaching. Mathematics and humor are not perceived as being in line with each other. Humor brings about a more pleasant atmosphere in class, reduces anxieties and can promote motivation and interest in the teaching of mathematics as well as creativity. A sample of 32 pre-service teachers preparing to teach mathematics at elementary school answered a questionnaire which relates to integrating humor in math class. An important conclusion to be drawn from the findings of this is the positive attitudes of the pre-service teachers regarding the integration of humor in teaching mathematics, and to strengthen the need for this in the process of training.

Key words: Humor, mathematics, math teaching, pre-service teacher, attitudes

When, if ever, have you had an opportunity to smile in a mathematics lesson?

The mathematician Littlewood (1953) wrote that: "one good mathematical joke is better and better mathematics than a dozen mediocre papers". He have mean maybe, also to a puzzle which sometimes comprises an element of humour or an illogical situation with which one has to cope, leading to a smile.

Take, for example, the following puzzle (Gazit, 1996): "A Chinese meets his neighbour and asks what the age of his children is. The neighbour replies: the product of multiplying the ages of my three sons is 36 and the sum of their ages is equal to the number of the house where we live. The Chinese thinks and says: one given is

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missing. The neighbour answers: right, my first born plays the violin. What is the age of my three sons?"

The violin makes us smile. What is the relation between the fact that the first born plays the violin and the age of the three children?

This is the beauty of mathematics, manifested by this kind of humour. The violin is of secondary importance to the problem solution and what is important is the datum about the first born – namely there are no twin first born sons.

Why is that important? If we write down all the possible combinations of the three ages – numbers with a product of 36, we find out that two of these combinations yield the same amount – the number of the house. The three ages 9, 2, 2 add up to 13 and so do 6, 6, 1 (the other six possible combinations result in sums which are different one from the other). The neighbour, who knows the number of the house, hesitates between the two options (if the combination was one of the six others which yield different sums he would not say that one given was missing and would solve the puzzle immediately). This is the catch of the puzzle. The solution is, obviously, 9, 2, 2 because there is one first born. However, math teaching does not provide, to say the least, situations of jokes which might make us smile.

An example which makes us smile but present math teaching in a grotesque and cynical way is presented in the article of Merseth (1993). She criticises the way mathematics is taught in the United States and includes in her paper a problem given to 3rd-graders in the Midwest:

"A shepherd has a herd consisting of 125 sheep and 5 dogs. How old is the shepherd?" This very question leads to the first smile, namely what is the relation between the shepherd's age and the number of sheep in the herd? Nevertheless, educational researchers (Merseth, 1993) indicate that three out of four pupils gave an answer. In her paper, Merseth brings a photocopied answer taken from the notebook of one of the pupils: $125+5 = 130$, too old! $125-5=120$, still old! $125:5=25$, that's it, the shepherd is 25 years old.

This answer makes us smile again, though sadly, because of the far-from-satisfactory situation of math teaching in the United States. Far be it from us to think that the situation in Israel is better. Perusal of text books illustrates boring learning material which includes recurrent exercises and monotonous problems without any trace of interest. All the books are written in an extremely serious manner, although here and

there one can find some allusion to riddles or mathematical anecdotes relating to daily reality or to the history of mathematics.

An American magazine for math teaching (American Mathematical Monthly, 1994) displays in a humoristic-ridiculous way the development of math teaching during the second half of the 20th century by illustrating typical problems of each decade:

The 1960s – A farmer sells a sac of potatoes for \$10. His expenses constitute $\frac{4}{5}$ of the price. How much will he profit?

The 1970s – A farmer sells a sac of potatoes for \$10. His expenses constitute $\frac{4}{5}$ of the price, namely \$8. How much will he profit?

The 1970s (new mathematics) – A farmer exchanged a set P of potatoes with set M of money. The cardinality of set M is equal to 10 and each element of M is worth \$1. Draw 10 big dots representing the elements of M. The set C of production costs is composed of two big dots less than the set M. Represent C as a subset of M and answer the question: What is the cardinality of the set of profits.

The 1980s – A farmer sells a sac of potatoes for \$10.00. His production costs are \$8.00 and his profit is \$2.00. Underline the word potato and conduct a discussion with your group members.

The 1990s – A male/female farmer sells a sac of potatoes for \$10. His or her production costs are 0.8 of his or her proceeds. Draw on your calculator a graph of the proceeds versus the costs. Run the POTATO programme in order to find out the profit. Discuss with your group members the results. Write a short report which analyses the example, using terms from the field of economics.

This example gives rise to a smile which probably hides our dissatisfaction with the so-called changes introduced in math teaching in order to make it more interesting or/and meaningful . Starting from a technical way of learning in the 1960s, to the study of arithmetics by means of set theory in the 1970s and then to teaching methods like small groups teaching and up to the use of the calculator.

Nevertheless, the queen is naked because this is the same queen in a different coat which is sometimes less dense and less challenging. Mathematics is not supposed to be a difficult and complex subject. The way of teaching mathematics, though, by using uninteresting text books and with not the best qualified teachers, turns learning into a traumatic experience for many pupils. The mathematician, philosopher and sociologist, Bertrand Russell, wrote that mathematics is a subject whereby no one understands what this is about. Yet if one does know, they are not certain it is right...

The Jewish-Hungarian mathematician Erdos, known as the home-less mathematician, used to travel from one colleague to another, staying in their houses and writing papers together. He drank a lot of coffee to stay alert. The book written about him (Hoffman, 2000) includes the following saying attributed to him: "A mathematician is a machine which turns coffee into mathematical phrases" – it is nice and makes you smile.

So, one can smile also in a math lesson, seasoning it with humor and anecdotes without undermining the educational rights. It can be done in various ways, e.g. in a context of a mathematical topic, a figure which contributed to mathematics, calculation method, interesting exercise, formula, a certain proof and so on and so forth.

For instance, when dealing with the orthogonal coordinate system conceived by Descartes, we can tell a bit about the man who was quite an adventurer or relate to his philosophy which advocated: I think, therefore I am. It can also be presented in a negative way: I don't think, therefore I do not exist. Then, we can tell the joke about Descartes who entered the local pub one evening. The bartender greeted him and asked: Shall I serve you the usual drink? Descartes answered: "I think not" and immediately disappeared...(“I think not” means “I don’t think” and therefore logically, he does not exist...)

Humor plays an important role in communication between people, starting at a very early age. Humoristic contents which evoke laughter change in the transition from infancy, throughout childhood and up to adolescence. Humor is essential in interpersonal relations within the various groups to which people belong. A sense of humor is perceived as a criterion for assessing popularity and adolescents with a sense of humor are considered as having a higher social status (McGee & Shevlin, 2009).

According to Freud (1960), humor facilitates relations which are not threatening in contexts of sex or aggression. Moreover, it helps to release tensions and prevent stress. The use of humour is perceived as an indicator of a positive mood, decrease of anxiety and depression as well as improvement of cognitive capabilities (Herzog & Strevey, 2008).

In a study conducted by Ford, Ford, Boxer and Armstrong (2012) adult students who were exposed to humorous cartoons performed better on math test comparing to control group students who were exposed to non humorous poems or nothing at all.

The researchers' explanation is that exposing to humorous cartoons reduced anxiety while taking the test. In another study (Berk & Nanda, 2006) investigated differences between humorous and serious versions of the same test content among graduate biostatistics students. The results showed significant impact of humor on performance in descriptive statistics items which is explained by anxiety reducing

The classroom is a social system to which various teacher-pupil and pupil-pupil messages are channelled. During math lessons there is usually a relatively high heterogeneity between the pupils. Low-achieving pupils lose confidence and their self-image is diminished in addition to the low sense of self-efficacy. Math teachers who are aware of the situation can use humor as a means of improving the class climate and promoting inter-personal communication.

Friedman, Friedman & Amoo(2002) suggested how to use humor in statistics course for creating positive learning environment and for improving communication between student and the teacher. They include in their article some jokes and humor to be used according to the order presentation of introductory statistics.

Humor leads to fraternity and equality between group members regardless of their status. Regarding the use of humor in class, it was well expressed by the reforming educator Alexander Sutherland Neill (Cohen, 1996): "Humor indicates equality. Those teachers who do not bring humor into their class do it deliberately since humor unites all those present and eliminates the distance between teachers and pupils. If teachers joke with their pupils, making them laugh, they undermine the attitude of politeness pupils show them. The pupils realizes that the teachers are human, God forbids"

If, for example, math teachers want to lift the spirit of pupils who usually encounter difficulties in learning the subject, they can tell the story about Einstein (Calaprice, 1996). During the 1940s, Einstein was a famous scientist in the United States and he received letters about varied subjects from different people. One female high school student wrote him a letter, asking his advice about her problems in mathematics. Einstein told her not to worry because his problems in learning mathematics were much more serious...

This is one way of presenting situations which evoke smiles in order to calm pupils and reduce their anxiety. Another way is telling a joke associated with a specific topic or some figure from the world of mathematics, like the story about Descartes described earlier.

There is website (Chercaev, 2000) which deals with humor in mathematics. The introduction indicates that mathematical folklore can cause pleasure to both mathematicians and pupils since every joke contains a certain amount of truth or lie about the subject. Below are several examples of jokes which mathematics teachers might use when teaching the subject or perhaps in the context of the relevant topic:

Several scientists were asked to reply to the question: what is the product of 2×2 ?

The engineer took out his slide rule (an "ancient" means of calculation used prior to the age of calculators), slid it forward and backward until reaching the result: 3.99.

The physicist used the appropriate formulae, inserted them into his PC and announced that the result is somewhere between 3.98 and 4.02.

The mathematician reflected for a while and then said: "I don't know the answer but I can definitely tell you that it exists!"

The philosopher smiled, asking: "But what do actually you mean by 2×2 ?"

The sociologist said: "I don't know but it was nice talking about it".

The student of medicine said: "4".

All the others looked at him, astonished: "How do you know?"

And the student replied: "I remembered it..."

This joke embodies some sort of irony and ridicule about math teaching which, in fact, requires pupils just to remember, while the other scientists try to adjust the solution to their structure of knowledge.

Teachers should be sensitive to the state of mind in class and to the pupils' characteristics and avoid presenting humor which might be difficult to understand, might offend or be rejected by several pupils. Warwick (2009) found in a small scale experiment among first year undergraduate students studying computing diversity of opinion about what constitutes humor. This diversity depended on ethnic, gender, age and social grouping. Some people find it emotionally hard to accept humour due to suspiciousness; others could be introvert people who do not get connected to humor. People are apprehensive that others would laugh at them and that they would be involved in this laughter in the presence of other significant people (Platt & Ruch, 2009).

The relevant conclusion is that one needs to be cautious when using humor without knowing the other side – the message addressee. However, beyond that, humor plays an important cognitive role in the ability to bring about more attention and concentration by taking some time-off in order to share a smile for the continued learning. Furthermore, humor is a means of improving learners' creativity. A humouristic ability attests to a high intellectual level combined with creativity. Humor has an element of wit which is synonymous with sharp mind, sophistication and ability to conceive bright verbal ideas which require some degree of creative thinking. (Garner, 2006)

Using humor for the explanation of terms and principles might stimulate learners to look for creative ways of solving mathematical assignments. Only positive numbers have a real square root whereas for negative numbers an imaginary root was defined as i – imaginary. The root of $4 = 2/-2$ and the root of $-4 = 2i$. And the joke:

Two mathematicians meet. One of them says to the other: "I had a frightening dream in which I was minus one sitting under a root sign". "What did you do?" asks his friend. "I jumped out and shouted ay (i)....."

Pupils can be encouraged to create amusing situations or invent mathematical jokes and humoristic phrases which relate to mathematical topics. Pupils can be asked to write for five minutes humoristic ideas about various mathematical issues. There are mathematical terms with double meaning like root, power, division, function etc., allowing a humoristic linguistic celebration.

And most importantly for teachers – humor decreases burnout, improves self-image and attributes added value to the teaching process. Studies show that using humor is one of the criteria by which pupils identify the figure of good teachers (Kuperman, 2006).

To sum up, we emphasize the positive features of humor as removing barriers, increasing attention, improving thinking and creativity processes, serving as a consolidating means in a group, in addition to enhancing the self-image of both learners and teachers. Humor brings about a more pleasant atmosphere in class, reduces anxieties and can promote motivation and interest in the teaching of mathematics – one of the goals of teaching this subject.

Aim of the Research

The aim of this research is to examine the attitudes of pre-service teachers specializing in the teaching of mathematics in primary schools, towards the introduction of humor into mathematics lessons.

Methodology

Research question

What are the attitudes of pre-school mathematics teachers towards the introduction of humor into mathematics lessons?

The Research Population:

Thirty two students in a teachers' training college specializing in the teaching of mathematics in the primary schools

Research Tools:

A questionnaire containing 20 statements relating to the use of humor in mathematics class. The responses to each element range from 5 - fully agree to 1 - do not agree at all.

The questions covered five (5) categories:

- a. The nature of mathematics (items 4,5)
- b. Attitude towards integrating humor with mathematics (items 1,8,17,19,20)
- c. The advantages of integrating humor with teaching. (2,7, 9, 10, 11, 15, 16, 18)
- d. The disadvantages of integrating humor with teaching (items 3,12,14)
- e. The attributes of humor (items 6,13)

Limits of the research

The small sample does not enable to make generalizations but it may show some trends to be study in larger sample in the future.

Results

Table 1: Distribution of responses according to the different statements and the average (N-32)

Statements relating to use of humor:	FULLY AGREE 5	AGREE 4	NO OPINION 3	DO NOT AGREE 2	DO NOT AGREE AT ALL 1	AVERAGE
1. There is no place for inclusion	1	0	0	8	23	1.4
2. Reduces Anxiety	22	6	2	1	1	4.5
3. Lack of respect for the teacher	1	0	3	13	15	1.7
4. Serious atmosphere	12	14	4	1	1	4.1
5. The nature of mathematics*	0	1	1	11	18	1.5
6. Equal status with the teacher*	3	4	8	10	6	2.6
7. Improved atmosphere	20	12	0	0	0	4.6
8. Must not be used	0	0	0	5	27	1.2
9. Improved communication	17	10	5	0	0	4.4
10. Effective teaching	13	12	6	0	0	4.2
11. Encourages thinking	17	10	4	1	0	4.3
12. Interruptions during the lesson	0	3	16	11	2	2.6
13. Elimination of gap	1	9	10	6	6	2.8

14. Attention is not serious	1	3	4	11	13	2.0
15. Reducing attrition	10	12	4	1	5	3.7
16. Enhancing creativity	19	12	0	1	0	4.5
17. I'll put in a sense of humor	17	13	2	0	0	4.5
18. Improving self - esteem	6	12	9	3	2	3.5
19. I'll include jokes	13	11	8	0	0	4.2
20. Agreement with Littlewood statement (1953)	13	13	4	2	0	4.2

Note: * For these items there were 31 responses from among the 32 participants

Analysis of the results

a. The Nature of Mathematics.

Two items (4, 5) relate to the nature of mathematics lessons and of mathematics itself. The majority of participants, with an average of 4.1, agreed that mathematics lessons are characterized by an overly serious atmosphere, whilst one participant did not agree, and one did not agree at all. Four participants indicated that they held no opinion (3) either way. The majority of participants, with an average of 1.5, did not agree that the nature of mathematics does not make the use of humor possible, whilst only one participant did agree with this determination, and one did not express any opinion. (3).

b. Attitude towards the inclusion of humor.

The three items relating towards the inclusion of humor in the teaching of mathematics, not from the human aspect of the participant, but to the overall

aspect relating to teaching, were 1, 8, and 20, where two were asked in a negative fashion:

1. There is no place for including humor in mathematics lessons:
8. The teacher must not use humor in mathematics lessons:

The participants, with an average of 1.4, 1.2 respectively, almost unanimously did not agree with these two statements; only one participant indicated full agreement (5) that humor should not be integrated into mathematics lessons.

Item No. 20 examined the degree of agreement with the point of view of the English mathematician Littlewood(1953), regarding the preference of a good mathematical joke over a dozen mediocre exercises. The average was 4.2, which indicates that the majority of participants agreed, except two that did not agree, and four that did not express any opinion.

Two Items related to the opinion regarding integration of humor with mathematics at the personal level.

Item No. 17 examined whether or not the participant would introduce a sense of humor into their lesson. An average of 4.5 indicates a high degree of agreement. Thirty of the thirty two participants, (93.75%) either agreed or fully agreed, and only two did not express an opinion.

Item No. 19 was similar, but was more concentrated, and relevant to introducing humor into the classroom: "I will introduce mathematical jokes....." An average 4.3 indicates a high degree of agreement, although lower than the item of introducing a degree of humor. Only 24 participants (81.25%) agreed, or fully agreed, and 8 expressed no opinion.

- c. The advantages of integrating humor with teaching.

Six items relate to the potential advantages of humor for mathematics lessons and the degree of agreement increases from 4.2 for effective teaching, through

4.3 for improving thinking, 4.4 for improved communication, 4.5 for reducing anxiety and enhancing creativity, up to 4.6.

There was complete agreement for an improved environment, with no one indicating that they had no opinion (3).

There was one disagreement for the use of humor to encourage thinking and improve creativity. One participant did not agree, and one did not fully agree with using humor as a means of reducing anxiety.

Regarding reduction of anxiety, improved communication, effective teaching, and enhancement of thinking, there were 2, 5, 6 and 4 participants respectively that expressed no opinion.

Two items relate to advantages potential of humor for improving the teacher's personal qualities. Item No.15 relates to the reduction of attrition. An average of 3.7 indicated agreement, with twenty two participants (68.75%) agreeing, or fully agreeing, as compared to one who did not agree, and five participants who did not agree at all. This illustrates that there is a certain spread of responses to this item, with 6 of the participants (18.75%) who do not agree with the statement that the use of humor reduces attrition, and four participants expressed no opinion.

Item No. 18 relates to the improvement in the teacher's self-esteem. The average of 3.5 is similar to that for the reduction in attrition, where only just over half the participants (56.25%), agreed or fully agreed. Five participants did not agree, or did not agree at all, and a relatively higher number of participants – 9 (28.12%), did not express an opinion.

d. Disadvantages of integrating humor.

Three items express potential disadvantages of integrating humor, whereby lack of respect for the teacher (item No.3) receives maximum disagreement by the participants with an average of 1.7, and only one participant fully agrees. Three participants did not express an opinion. Also for item No. 14, "Attention is not serious", which is close to the element of lack of respect, there is an

average degree of disagreement of 2.0 with three participants agreeing, and one participant fully agreeing that humor may result in a non - serious attitude to a lesson. Three participants did not express an opinion, and if we relate to the degree of non – agreement, or non – agreement at all, it reaches 75%.

Regarding the third disadvantage – "Use of humor may result in disturbance" (item No. 12), half the participants preferred not to express an opinion. This is the highest rate of the expression of no opinion amongst all the elements, where the average rate for the expression of no opinion for the remaining items 12.3%, an approximate average of four responses per element. It is possible that the lack of teaching experience prevented half the participants from responding, as we are talking of practical teaching.

e. The attributes of humor

Two items relates to the attributes of humor, as expressed in the theoretical background material, as a means of removal of barriers and creating equality amongst the participants. The equality of the teacher to the pupils can be an advantage or disadvantage, depending on how one looks at it from a subjective point of view.

One item relates to the use of humor as a factor in the equalization of the status of the teacher to that of the pupils (No.6). Here there was a distribution of responses amongst all the degrees of agreement with an average of 2.6 that is between agreement and no expression of opinion. Ten participants did not agree, and six did not agree at all, thus the percentage not agreeing that humour creates an equal status between the teacher and the pupil reached 50%. Four participants agreed with the statement, and three totally agreed. Eight participants (25%) did not express an opinion and one did not respond at all.

Item No. 13 was connected in a different way to the status of the teacher and the pupil, and related to the use of humor as a means of removing the gap between them. The average obtained, 2.8, is similar but a little higher than the

average of the parallel item, but the dispersion is slightly different: Only twelve participants (37.5%) did not agree, and ten did agree (31.25%), with ten not expressing an opinion, and this is almost a uniform distribution between agreement, disagreement, and no opinion, despite the fact that six participants did not agree at all and one totally agreed with the statement.

Discussion and conclusions

The aim of the research was to examine, from different viewpoints, the opinions of teacher trainees who were specializing in the teaching of mathematics in primary schools, regarding the integration of humor into mathematics lessons. The result of the responses to twenty items on the questionnaire presents a positive picture of accepting humor as a tool for improving different teaching components, with the desire to use humor without fearing that its integration may result in negative behavior. The majority of participants agree that mathematics lessons are characterized by an overly serious environment (81.1%) and at the same time do not agree that the nature of mathematics does not have room for humor (90.6%).

If this is so, then what is their opinion on the integration of humor with the teaching of mathematics?

Most decisively, all the participants disagreed with saying that humor should not be used in the teaching of mathematics, and only one fully agreed with saying that there was no place for integrating humor in mathematics classes. When asked to relate to the claims made by the mathematician, Littlewood (1953), regarding the preference of a good mathematics joke over a dozen mediocre papers, there was 81.1% agreement, and no disagreements.

Where the integration of humor into the teaching of mathematics reached the personal level of the participants who were asked to express an opinion regarding the integration of humor into lessons, there was almost complete agreement -93.7% to the introduction of an element of humor into mathematics lessons. The introduction of an element of humor is not compulsory and not operative as an element of humor is something relative – a teacher's comment, such as "what's up?" can also be interpreted as the introduction of humor. But when the element relates to the integration of a joke

– something more defined and operative than just an element of humor, the percentage of agreement drops to 75% even though this is still the majority, but there are still two that do not agree.

If there is a high rate of agreement for integrating humor into the teaching of mathematics at the personal level then the participants see an advantage in it. Six advantages were presented to the participants: Reduction of anxiety, improved environment, improved communication, more effective teaching, enhancement of attention and improved creativity. The percentage of agreement to these advantages ranges from 100% for improved atmosphere, 96.9% for improved creativity with one disagreement, 87.5% for reduction of anxiety with two disagreements and two with no opinion, 84.4% for improved communication and enhancement of thinking, for which there was one disagreement, 78.1% for more effective teaching.

The attitudes of these pre service teachers are consistent with the findings in research literature on the contribution of humor to teaching. Wagner & Urios-Aparisi write that it is possible to logically and intuitively assume that humor creates a pleasant atmosphere in the classroom and reduces anxiety. (Wagner & Urios - Aparisi 2011). Humor improves cognitive ability (Herzog & Strevey, 2008), and can create for the pupil the desire to look for creative ways for solving mathematical tasks.

The responses expressed by the participants, demonstrates perhaps, in one way or another a social wish or response to what is expected according to the literature. On the other hand there is no pedagogic reason to support the integration of humor into teaching as would be expected from a method of teaching or evaluation. It is possible to learn more on this from the elements in the category of disadvantages.

87.5% did not agree to the loss of respect, and only one agreed. Less than 75% disagreed with a non-serious approach, and one agreed. However regarding disturbance during a lesson, 50% of the participants chose not to provide an opinion (3) and this may be evidence of an internal conflict between providing an independent opinion and a desire to satisfy the research. Only 40.6% disagreed and three participants agreed that the integration of humor into a lesson creates disturbance. It must be borne in mind that the participants learn in a college in order to obtain a teaching qualification and only a few have any practical experience. Teachers report on lack of respect by the pupils as one of the factors leading to attrition, and this leads

to disturbance and a non-serious approach. Nevertheless, the participants did not have a problem of lack of respect as a result of the use of humor.....

Two advantages of humor related to the influence on the teacher regarding the reduction of attrition and improvement of self-esteem. The majority of participants – 68.75% agree that use of humor reduces attrition and 56.25% agree that humor improves the teacher's self-esteem. There were 5 participants in the whole element that expressed disagreement, and the rest offered no opinion. It is possible that the range of responses is the result of the lack of experience, as is also the lack of expression for these two sensitive elements during the training process. However from the overall point of view the opinions of the participants is consistent with the recommendations of the research literature that emphasizes the function of humour as a reducer of attrition, improver of self-esteem, and provider of added value to the process of teaching. (McMahon 1999, Minchew, 2001).

As Neill (in Cohen, 1996) wrote, humor makes equal teacher and pupil, something which may threaten the teacher. In the two elements that examined the subject of removal of the gap between teacher and pupil, and equality between them, there was a range of answers that perhaps strengthens the problem of an uncertain situation in which the results are unpredictable. It is also not clear from the responses whether the situation of equality between the teacher and pupil when there is humour is negative or positive, and it seems that this is also one of the reasons for the spread. 31.25% of the participants expressed agreement on the subject of removal of the gap, while 37.5% did not agree and 31.35% did not express any opinion either way – an almost meaningless equal division between the opinions. On the other hand 50% of the participants agreed with the position on the equal status of the pupil with the teacher, and only 21.9% disagreed.

An important conclusion to be drawn from the findings of this research is the positive attitudes of student teachers of primary school mathematics regarding the integration of humor in teaching mathematics, and to strengthen the need for this in the process of training. In the search for articles that deal with the subject of humor and math teaching from 2000 onwards, I could not find even one. On the other hand there are articles that deal with the integration of humor into teaching foreign languages or English (Wagner & Urios-Aparisi, 2011, Minchew, 2001, McMahon 1999).

The researchers showed that the use of humor is one of the criteria by which pupils identified the character of a good teacher. (Cooperman 2006). Humor also has a

potential for improving the process of teaching and enabling the teacher to appear more human and less threatening. (Torok, McMorris & Wen-Chi, 2004). This is the character of mathematics teacher that is needed by the education system that is finding its way between the non-complimentary results of international examinations and the school efficiency and growth indices in mathematics.

In conclusion we emphasize the positive advantages of humor as a removal of barriers, increaser of attention, improver of the process of thinking and creativity, and as a tool for group formulation and cohesion, together with its contribution to strengthen the self-confidence of both teacher and pupil. Humor creates a pleasant atmosphere in the classroom, reduces anxiety, and can improve motivation and interest in teaching mathematics – one of the goals of teaching the subject.

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