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*Raed Zedan & Jarmas Bitar*

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360 math teachers from the Arab and Druse sector were randomly chosen from elementary schools in the North of Israel. A quantitative methodology has been used in the present study: two questionnaires were used as tools: a questionnaire for examining math teachers' attitudes toward the use of humor (Gazit, 2013, Hebrew); and a questionnaire for examining the motivation for using humor in teaching (Ingels, 2010).

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# Integration of Humor in Math and Science Teaching

Raed Zedan<sup>a</sup> & Jarmas Bitar<sup>a</sup>

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*Humor and laughter are two interwoven concepts, often related to enjoyment and good mood. They constitute a significant part of our behavior. In light of previous studies which pointed to the significance of humor in teaching, the present study examines the relations between math teachers' attitudes toward the use of humor and their motivation to use humor in their teaching. The study question is: what is the relation between elementary school math and science teachers' attitudes toward integrating humor in their classes, and their motivation to use humor in their teaching.*

*360 math teachers from the Arab and Druse sector were randomly chosen from elementary schools in the North of Israel. A quantitative methodology has been used in the present study: two questionnaires were used as tools: a questionnaire for examining math teachers' attitudes toward the use of humor (Gazit, 2013, Hebrew); and a questionnaire for examining the motivation for using humor in teaching (Ingels, 2010).*

*The results of the study show that math teachers who have positive attitude toward humor, have a higher motivation to use humor in their teaching, and a significant positive relation was found between teachers' attitude toward integrating humor and its spontaneous use by them.*

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## I. INTRODUCTION

Humor and laughter constitute a significant part of our behavior and make our lives more pleasant (Bolkan, Griffin & Goodboy, 2018). They are interwoven concepts which lead to enjoyment and good mood, ease tension and bring relief in different situations. As such, humor is treated seriously and its significance is revealed in many realms of our lives. When it comes to education and teaching, it seems that humor may contribute to the attention and focus of students, and help alleviate tensions which may hinder learning (Ostrober, 2010).

Inan, Lowther, Ross and Strahl (2011), claim that humor is a tool which helps to increase the concentration of the learner in class, and may be used as an efficient teaching strategy to motivate students to learn and improve their achievements. It may also help in organizing the learning material, for a better understanding and remembrance and may help the teacher to supervise and evaluate the learning process (Inan et al., 2011). Thus, creative, humor-integrated teaching strategies on behalf of teachers may be needed in order to improve students' learning.

Strategies of integrating humor for the purpose of learning, are especially relevant to teaching-learning of the math and science subjects which are considered by many students as stressful school subjects (Zedan, 2008). The teacher, as the one in charge of teaching and learning (Hativa, 2003) is expected to have a motivation to teach and to be skillful in creating a positive atmosphere in class. Thus, integrating humor, as a tool which creates positive atmosphere in class in general, and in the math

class in particular, may increase teachers' motivation to use it, create positive attitudes toward math and increase the likability that students will like it (Gazit, 2011).

## II. LITERATURE REVIEW

Humor is a broad concept which relates to things people say or do that are perceived as funny and cause others to laugh (Martin, 2007). Another definition, which focuses on the cognitive aspect, defines humor as a state or a process in which the individual mentally experiences a revelation or creates absurd, incompatible ideas, events or situations. Thus, humor depends on the timing, place, culture, situation and participants (Bolkan, Goodboy, & Myers, 2017; Titsworth, Mazer, Goodboy, Bolkan, & Myers, 2015).

## III. THE USE OF HUMOR AS A TEACHING STRATEGY

There are several types of humor, which can be used as teaching tools. Banas, Dunbar, Rodriguez & Liu (2011) mention the following types: humor related to the learning material, funny stories which are related to the learned contents, humoristic remarks, self-humor, spontaneous humor, jokes, riddles, word games, funny learning aids and visual demonstrations.

According to Gazit (2011), math teaching in Israel and in the rest of the world is usually done in a monotonous teaching style, which stresses drilling and memorization, and does not include the use of humor. Although math teachers sometimes use humor in their teaching, such as presenting to their students math riddles or mathematical curiosities related to the everyday reality, or to math history, such occasional usage is the exception rather than the rule. The reason for such occasional use, according to Gazit, is the rigid, unambiguous nature of the subject, and its focus on numbers and forms.

According to the Ministry of Education Curriculum one of the three goals of the math subject teaching is to prevent failure and make the students like the subject (the two other objectives

being acquiring mathematical concepts and developing proper skills for the subject). Gazit (2011) suggests that integrating humor in math classes may create positive attitudes of students toward the subject. Unfortunately, the math curriculum does not include strategies for such cause.

Young (2013) who is both a math teacher and a comedian, described her positive experience with her students in using the comedy principles in her math classes. She used humor games and found positive reactions of students toward such usage. She concluded that using such games may help students to learn to think creatively, to take risks, to support their classmates and to solve problems. Young presents theoretical and practical applications that may help teachers to integrate humor in their math classes.

## IV. MOTIVATION

Motivation or a lack of motivation is a personal characteristic, which determines to a great extent the individual's ability to achieve his personal goals. It is a main source for the fulfillment of the individual's needs and expectations. The word *motivation* is derived from the Latin word *motivus* which means a driving force. Therefore, it is defined as a driving force, in work as well as in other activities, to invest intellectual, physical and mental efforts, voluntarily (Bar-Haim, 2004).

Another definitions of motivation is offered by Robbins and Judge (2009) who suggests that motivation refers to investing many efforts in order to reach a goal which is conditioned on the individual's ability to fulfill his own needs. Williams and Burden (1997) suggest that individuals who demonstrate motivation are curious, highly interested in their work, and have passion for accomplishments. Yet, interest alone is not enough and there should also be an investment of effort, time and persistency.

Another definition of motivation is presented by Asor (2005) who defines motivation as a concept which refers to the will to invest time and effort in a certain activity, even when it is accompanied

with difficulties, high cost and failures (Asor, 2005, p. 3). Asor states that motivation is an internal mental entity, and that we are not able to estimate its power in different aspects, such as through conversations and verbal reports, tracking behavioral expressions (for example, investing time and effort in an activity, presence and punctuality, persistency and effort or failure, challenge responsiveness and fulfilling obligations). He refers to two main aspects of motivation: Power - the intensity of the will to invest in a relevant activity, and a sense of autonomy – the will to invest is perceived and felt by the individual as derived from his own choice, or as based on an external coercion.

Motivation is influenced by different factors related to the individual and the setting in which he acts. In its core lies the personal necessity of the individual to fulfill his own needs. Some needs have to be satisfied in order to enable a basic existence while others require fulfillment for the wellbeing of the individual. The highest needs are those which bring to self-fulfillment. Unfulfilled needs create an impulse, an inner psychological drive, which stimulates action (Maslow, 1954, in Asor, 2001). The goal of such action is to fulfill the needs. After being fulfilled, the needs subside. According to these theories, the goal of the motivated behavior is needs fulfillment and drive sub.

Motivation is usually created when the individual experiences an unfulfilled need. In order to fulfill that need, a goal is set, and the way in which the need can be fulfilled is contemplated. In the work setting, rewards and incentives may be present, which increase the individual's motivation to reach his goal. The motivation level is also influenced by the social context. This context includes the organizational values as well as the organizational culture. It also includes leadership and management, as well as the group or the team influence in the framework of which the worker acts (Salanova & Kirmanen, 2010).

The teacher's motivation has a significant role in students' learning process, since he or she serves a

role model. The teachers' motivation is of great importance, due to its direct influence upon the students. The significance of motivation in the educational realm presents different questions regarding the factors which influence the teacher's motivation. In this regard, Alam and Farid (2011) have found that the teacher's motivation is influenced by many factors such as: personal and social factors, the classroom setting, the socio-economic status, students' behavior, time pressures related to the learning material, rewards and incentives, teacher's self-confidence, teacher's personality, and more.

## V. THE PRESENT STUDY

### 5.1 The Study Hypotheses

The study hypotheses are:

1. A positive relation will be found between math teachers' attitudes toward integrating humor in their classes, and their motivation to use humor in their teaching.
2. A Positive relation will be found between the measure 'benefits of integration of humor in math teaching' and 'tension alleviation' and 'the motivation to use humor'.

## VI. METHODOLOGY

The study array is quantitative-correlative, which is commonly used in survey studies. It makes use of statistical-quantitative techniques to collect and analyze data (Zedan, 2018).

### Sample

360 math and science elementary schools teachers from the Arab sector in the center and the North of Israel, were randomly chosen. The schools from which the teachers were chosen shared similar socio-demographic characteristics.

### Tools

*2 close questionnaires were used*

A questionnaire for examining teachers' attitudes toward using humor in math classes (Gazit, 2013); and a questionnaire for examining the factors

which influence teachers' motivation to use humor during science and math classes (Ingels, 2010). Table 1 presents the structure of the two questionnaires.

**Table 1:** The structure of Teachers' Attitudes toward Using Humor in Math Lessons Questionnaire and Motivation for Using Humor Questionnaire

Questionnaire	Measures	Items	Alpha Cronbach Reliability	Mean	Standard Deviation
Teachers' attitudes toward using humor	General attitudes	1-20	0.83	3.19	0.76
	The nature of math lessons*	4,5	0.59	3.48	0.89
	Attitudes toward Integrating humor	1,8,17,19,20	0.81	3.87	0.66
	Humor characteristics	6,13	0.62	2.69	0.79
	Humor integration benefits	2,7,9,10,11,15,16,18	0.84	3.59	0.72
	Humor integration disadvantages	3,12,14	0.76	1.82	0.69
Motivation for using humor	Humor using motivation general	1-31	0.88	3.26	0.67
	Lesson situations	1,2,3,5,6,7,8,13,20	0.79	3.56	0.91
	Tension alleviation by the teacher	4,14,19,22	0.76	3.28	0.67
	Learning-oriented humor	12,17,21,28,29	0.81	3.27	0.71
	Humor for behavior processing	9,10,11,30	0.77	3.03	0.59
	Spontaneity in using humor	15,16,23,25,26,27,31	0.83	3.11	0.48

- Pearson coefficient correlation was calculated between the two items

## VII. RESULTS

The results of the study regarding teachers' attitudes toward integrating and using humor in their teaching, as presented in table 1, show that the teachers expressed positive, yet moderate and sometimes above-moderate attitudes toward integration of humor in teaching. The teachers believed that the use of humor in class had more advantages than disadvantages. The mean result of the five measures of 'motivation for using humor in teaching' (in-class situations; the use of humor by the teacher to alleviate tension; using learning-oriented humor; using humor for processing behaviors; and spontaneity in using humor) was moderate, and points to a moderate

motivation of the participants to use humor in their teaching.

The first study hypothesis was that a positive relation will be found between math teachers' attitudes toward integrating humor in their classes, and their motivation to use humor in their teaching. This hypothesis was examined by Pearson test for two variables: 'integrating humor' and 'motivation for using humor'.

Table 2 Presents the Pearson coefficients of the dependent variable regarding motivation to use humor in class.



**Table 2:** Pearson coefficients – Attitudes toward integration of humor and motivation to use humor in teaching (n=360)

	Motivation for using humor in teaching					
	Motivation for using humor in teaching	Situations in class	Alleviation of tension by the teacher	Learning-oriented humor	Using humor to process behaviors	Spontaneous use of humor
Attitudes toward using humor	0.47***	0.58***	0.14	0.43***	0.21*	0.32**

As can be seen in table 2, a significant, positive relation was found between the measure 'attitude toward using humor' and the general measure 'motivation for using humor in teaching' ( $r=0.47$ ,  $p<0.001$ ). Positive relation was also found between the measures 'motivation for using humor in teaching': 'situations in class' ( $r=0.58$ ,  $p<0.001$ ), 'learning-oriented humor' ( $r=0.43$ ,  $p<0.001$ ), 'using humor to process behaviors' ( $r=0.21$ ,  $p<0.05$ ), and 'spontaneous use of humor' ( $r=0.32$ ,  $p<0.01$ ), of the variable 'attitude toward

integrating humor'. Yet, no relation was found between 'attitudes toward integrating humor' and the measure 'alleviation of tension by the teacher' of the 'motivation for using humor' variable.

The second study hypothesis was that a positive relation will be found between the measure 'benefits of integrating humor in teaching' and 'tension alleviating' and 'motivation for using humor'. Is has been examined by a Pearson test, as can be seen in table no. 3.

**Table no. 3:** Pearson coefficients between advantages of integrating humor and motivation for using humor in teaching (n=360)

	Motivation for using humor in teaching					
	Motivation for using humor in teaching	Situations in class	Alleviation of tension by the teacher	Learning-oriented humor	Using humor to process behaviors	Spontaneous use of humor
Benefits of integrating humor	0.43***	0.57***	0.11	0.48***	0.31**	0.35**

\*\* $p<0.01$ , \*\*\* $p<0.001$

As can be seen in table no. 3, a positive relation was found between the measure 'benefits of integrating humor' and the measure 'motivation for using humor in teaching' ( $r=0.43$ ,  $p<0.001$ ). It can also be seen that a significant relation was found between the measure 'benefits of integrating humor' and the other categories: 'situations in class' ( $r=0.57$ ,  $p<0.001$ ), 'learning-oriented humor' ( $r=0.48$ ,  $p<0.001$ ), 'using humor to process behaviors' ( $r=0.31$ ,

$p<0.01$ ), and 'spontaneous use of humor' ( $r=0.35$ ,  $p<0.01$ ). No relation was found between the measure 'benefits of integrating humor' and the category 'alleviation of tension' ( $r=0.11$ ).

## VI. DISCUSSION

The first study hypothesis, a positive relation exists between math teachers' attitudes toward integrating humor in their classes, and their motivation to use humor in their teaching, was

verified. The results of the present study show that a positive relation exists between the measure 'attitudes toward integrating humor' and the measure 'motivation for using humor in teaching'. That is, math teachers with a positive attitudes toward humor, are more motivated to use humor in their teaching than teachers with less positive attitudes toward humor.

The literature supports this result and suggests that a positive attitude toward humor increases the motivation of teachers to use it in class, which in turn, contributes to students' motivation for learning (Rafiee, Kassaian and Dastjerdi, 2010; Girlefanny, 2004). In regard to the relation between teachers' attitudes and their motivation to use humor, the results of the present study show that teachers in general, and math teachers, in particular, resemble their students in this matter, and are interested in adding a humoristic touch to their classes. It is especially true in regard to teachers who already have positive attitudes toward humor. Accordingly, it can be concluded that individuals who have a tendency to use humor, see more situations as suitable for using humor. In addition, individuals with an orientation for using humor, make use of a wider variety of humor categories. These results are supported by Ingeles' (2010) suggestion that personality characteristics are among the main factors which contribute to the motivation to use humor and that using humor is related to several personality characteristics (Johnson & McCord, 2010).

In addition, according to the multi-measure theory for using humor, there are three main variables which influence the use of humor (Martin, 2007). The first variable is the motivation for using humor. Such motivation is derived from personality factors such as the tendency to look at the funny side of things, or from situational factors such as using humor as a reaction to certain situations. The second variable is cognition for humor and the third variable is using humor in communication. The main suggestion of the multi-variable theory is that these three variables act on one another mutually

in order to create humor. In a certain place and time, an individual will either have or will not have the motivation to use humor. In case he has such motivation, the individual will be able or not, to use humor (original humor or not); and finally, in case a humoristic thought arises, it can be communicated between individuals (Bolkan, Griffin & Goodboy, 2018).

According to Ingels (2010), motivation is a predicting variable for using humor. Thus, a positive attitude toward humor, which is based on personality characteristics, contributes to the teacher's motivation to use humor in class. This is probably true not only in regard to teachers, but with regard to all individuals. That is, an individual with positive attitudes toward humor will be more motivated to use it.

The results of the present study show that there is a positive relation between teachers' attitudes toward integrating humor and the spontaneous use of humor by the teacher. Accordingly, it can be assumed that teachers' attitudes toward humor are derived from personality characteristics (Dvořáková, 2012) which serve as the basis for the spontaneous use of humor. Such usage of humor is spontaneous and so teachers whose attitudes toward humor are less positive, will not tend to use humor unintentionally (Dvořáková, 2012).

In addition, when humor is properly used, it may help the teacher to deal with discipline issues in class, to increase the attention of the students, to improve the interpersonal communication, to assist in solving conflicts between the teacher and the students and among the students and to increase the motivation for learning (Ziv, 2001). Since a reaction for discipline issues has to be swift, and almost spontaneous, it is advised that it shall include elements of humor, for alleviating tension and resistance.

In order to use humor properly, teachers should develop their ability to use it (Hativa, 1997, in Zamir, 2007). The teacher should recall the joke in advance, adjust his tone of voice to the joke, integrate it naturally in the lesson, as if it has been created during the lesson, and should never



explain the joke. Learning to use humor, including spontaneously, is of great significance especially when it is used in order to deal with discipline issues. Yet, since humor is seen as an ice breaker in organizations, teachers may fear that the use of humor may decrease the distance between the teacher and his students, and may be interpreted as a permit to cross borders and to discipline issues (Hativa, 2006, in Zamir, 2007).

In accordance with our first hypothesis, the results show that a negative attitudes toward humor affect the motivation of teachers to use it, even when the humor is planned. This is especially true when it comes to unplanned humor. When the teacher's attitudes toward humor are negative, and his motivation to use humor is low, the chance that he will produce humor spontaneously, is almost non-existent, in contrast to a teacher with a positive attitude toward using humor. Such teacher who enjoys humor uses it spontaneously during his lessons to his own benefit and to the benefit of his students (Young, 2013).

According to our second hypothesis, there a relation exists between the advantages of using humor for tension alleviation and the motivation to use humor in teaching. That is, teachers' perception regarding the advantages of integrating humor to their teaching, increases their motivation to use humor and decreases students' tension in class. The results of the present study support this hypothesis only partially, since a positive relation was found only between the perception of advantages of integrating humor and general motivation. Yet, no relation was found between the perception of advantages of integrating humor and alleviating the tension in class.

This hypothesis was based on previous studies which found that using humor has many advantages, including a higher self-esteem of the students, and improved attention and memory of the students (Banas et al., 2011 et al., 1996; Higbee et al., in Rafiee et al., 2010). One of the main advantages of using humor in class, is

alleviating tension (Rafiee et al., 2010). Furthermore, studies have found that the use of humor in different learning frameworks contributes to a more pleasant atmosphere and supports learning (Ziv, 2001). Specifically, when teachers integrate humor in the learning process and exemplify through their behavior that integrating humor in the framework of online learning of academic courses, increases the interest level of the students and encourages them to increase their online participation in the lesson (Gibson & Shatz, 2005). Thus, self-humor of the teacher may contribute to improve the learning climate. Such humor turns the teacher into the object of humor, emphasizes his human weaknesses and thus, evokes sympathy. In classrooms in which a high tension exists, self-humor of the teacher may decrease the gap between him and his students and make them feel comfortable: self-humor gives the feeling that the teacher is self-confident enough to laugh at himself and his shortcomings, in spite of his status. It seems that humor in uncomfortable situations in class may help the teacher to overcome them easily. For instance, after presenting the learning material frontally, when nobody speaks, saying something like "either I am a wonderful teacher and you understand everything, or I am a horrible one and you understand nothing", may break the ice and bring a flow of questions on behalf of the students (Gibson & Shatz, 2005).

The results of the present study show that a teacher who is aware of the benefits of using humor in class will be more motivated to use it, for the benefit of his students. In spite of our hypothesis that the use of humor reduces tension, the results of the present study did not show that. A possible explanation is that the math lesson is accompanied by great tension, and the use of humor is not sufficient in order to alleviate such tension.

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