

The Use of Humour and Its' Relation to Motivation in Teaching and Learning Mathematics

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Abstract

The use of humour in teaching mathematics can reduce mathematics anxiety which leads students to feel tension, apprehension, and fear of situations involving mathematics. The aim of this research is to investigate the use of humour in teaching mathematics and its relations with motivation. This study employs a mixed method design which is quantitative in the form of survey (n = 344) and qualitative in the form of an interview (n = 6). The quantitative survey used was a questionnaire to measure students' perceptions and preferences on the use of humour by their Mathematics teacher. In contrast, qualitative data were collected based on semi-structured interviews on the impact of humour in teaching mathematics towards motivation. The quantitative findings indicate that there is a gap between students' preferences on the use of humour and teachers' practice of humour in class. Moreover, the findings indicate that students reported a positive correlation between humour and motivation in classroom. Interestingly, qualitative findings illustrate that humour creates a positive classroom atmosphere and generates a positive experience and emotional engagement towards mathematics. In conclusion, this study provides insight for teachers to practice the use of humour in teaching mathematics. It is proven to be a very effective learning tool that can enhance students' motivation.

Keywords

Humour, Motivation, Mathematics, Teaching and Learning

1. Introduction

The fourth industrial revolution requires mathematical skills and competencies

that are currently indispensable in professional career and social life. However, Mathematics is often associated with stress and frustration (Sokolowski & Ansari, 2017; Amran, Surat, & Rahman, 2019). The engagement with tasks that requires a mathematical approach triggers anxiety in many students. Maths anxiety is a form of stress or tension that causes negative emotional response, physical reactions, and also cognitive reactions towards mathematics that hinders person's ability to learn and carry out maths activities (Rozgonjuk, Kraav, & Mikkor, 2020; Cargnelutti, Tomasetto, & Passolunghi, 2017; Chang & Beilock, 2016). This anxiety will have an effect on students such as emotional disturbance, lack of motivation, poor achievement, negative behaviour, truancy and many more. If Maths anxiety is not dealt with, it will give a negative learning experience to students when studying Maths (Passolunghi et al., 2016; Khasawneh, Gosling, & Williams, 2021). Additionally, it will cause students to become unmotivated to learn maths thus affecting their future career choice (Fan, Hambleton, & Zhang, 2019). The students will be less likely to choose careers that are related to Mathematics.

Fun learning is a learning session that utilizes humour in class. Humour is behaviour or spoken words that are funny, and hilarious and can reduce tension (Amir, Biederman, Wang, & Xu, 2015; Chan, Hsu, & Chou, 2018). Humour is a creative expression that can bring joy or entertain others. Humour is aimed to reduce stress and anxiety in students (Amran & Bakar, 2020). Many studies related to humour have been carried out, across many fields, such as in the research context of leadership and organization, communication and many more (Romero & Cruthirds, 2006; Mesmer-Magnus, Glew, & Chockalingam, 2012). That being said, there is a gap in the previous studies that show there is a lack of attention given to the use of humour in the context of teaching (Sambrani, Mani, Almeida, & Jakubovski, 2014; Amran & Bakar, 2020). This is because, teachers have little knowledge, exposure and training in applying teaching instructions that contain humour especially in teaching Mathematics. Moreover, the implementation of humour in the teaching process is still at a low level and is seen as something insignificant.

Previous studies have explained that the use of humour in teaching can help teachers improve their lesson particularly when it comes to students' engagement, self-efficacy, motivation, concentration and students' interest to learn. However, previous studies have explained about the use of humour in teaching in the context of language learning and not mathematics (Askildson, 2005; Amran & Rahman, 2017). This is because, the use of humour in mathematics is considered to be difficult as mathematics is a subject that deals with numerical facts, abstract concepts and solutions to problems that require high cognitive reasoning. Therefore, this research aims to determine the relationship between the use of humour in teaching and students' motivation. This research also aims to explore how the use of humour can increase the motivation of students in learning maths. All in all, this research is very important as it strives to understand the

relevance of using humour in teaching Mathematics and whether it can be considered as one of the ways to increase students' motivation in learning Mathematics.

2. Research Background

Humour is behaviour or words that are funny, hilarious and make people laugh. Additionally, the use of humour brings joyous effect that can be positively accepted by others. Often the use of humour in communication is to reduce tension. Amir et al. (2015) and Chan, Hsu and Chou (2018) state that humour is a joyous behaviour, feeling or discussion that is expressed through laughter and is positively accepted by the receiver. Moreover, Berge (2016) and Banas, Dunbar, Rodriguez and Liu (2010) state that humour is a creative expression that brings joy and amuses the receiver which manifests through behaviour such as laughter. Therefore, it can be summarised that humour is the joy and happiness manifested by an individual for the purpose of reducing tension in a person (Bakar & Amran, 2020).

In the field of mental health, the use of humour is viewed as a form of therapy that is cathartic and relevant in helping clients who are facing severe anxiety and depression (Baixauli, 2017). Humour therapy, also known as laughter therapy, can help develop catharsis in clients who experiences anxiety and reduce aggressive behaviour and mood swings. Meanwhile, in the context of neuroscience, a fun learning environment can stimulate the production of dopamine (Chan et al., 2013). The production of the dopamine hormone is activated when students feel happy and motivated to learn. Dopamine is a chemical substance in the body which is the product of an amino acid called tyrosine. This chemical plays an important role as a neurotransmitter that helps brain cells to communicate with one another. The secretion of the dopamine hormone released when there is a stimulus of a fun learning environment or even a reward triggers a positive emotion especially through the use of humour.

There are more researches that highlight the use of humour in language learning than there are researches about the use of humour to learn mathematics (Aboudan, 2009; Ketabi & Simin, 2009; Jamian & Ismail, 2013). Teaching containing humour in the context of language gives a positive implication in the teaching and learning process especially in language development, grammar improvement in written and spoken language and increasing the capacity to solve problems related to language (Lovorn, 2008). Often the use of humour in language is presented in the use of words that are amusing, telling stories that are engaging for the students and role-playing characters in literature. Besides that, using humour in language is also integrated with the element of music that can attract students' attention to be engaged in the lesson. This approach will make the teaching session generate excitement and liven up the learning environment.

Ziv (1988), who has conducted a study on the effects of humour in teaching Statistics, found that students perform better in the exams. A study by Romal

(2008) illustrates that students find it easier to understand concepts and examples in maths class by adding the element of humour in the explanation of said examples. Furthermore, there is a positive correlation between teaching statistics with elements of humour and students' achievements in universities (Garner, 2006). Aside from that, Durdevic and Mirkovic (2013) have carried out a study on the level of communication that contains humour in learning mathematics. The findings show that the use of humour is practical and suitable for delivering the contents of mathematics. From the above discussion, it is clear that the use of humour is relevant and applicable in teaching mathematics. That being said, there are not a lot of studies that emphasise the importance of humour in teaching mathematics as compared to teaching language. This is because the use of humour in teaching language is viewed as more appropriate than in teaching mathematics as maths is all about logical reasoning.

It is here that humour can be viewed as one of the methods or tools to teach mathematics, either by verbal expression or the teaching materials. In other words, activities containing mathematical and problem-solving elements should contain humorous content, riddles and funny stories. The practice of humour in classroom includes using jokes, using entertaining objects or teaching aids, simulation, role-playing, and using texts or cartoon drawings in the lesson (Kellerby, 2011). In conclusion, humour in teaching mathematics is a teaching instruction that can help teachers in increasing students' motivation in learning mathematics.

3. Methodology

This study employs a mixed method design which is quantitative in the form of a survey and qualitative in the form of an interview. For the quantitative method, the data used in this study were drawn from a population of students between the ages of 14 - 16 years old from various schools in Malaysia. The samples were selected using systematic random sampling technique. A total of 344 students ($n = 344$) were involved in this study. The selection of sample is important to give feedback on the constructs of this study. The research instrument used was a questionnaire to measure students' perception and preferences on the use of humour by their mathematics teacher as well as students' motivation. This questionnaire instrument has a five-rating Likert scale; 5—Strongly Agree, 4—Agree, 3—Agree, 2—Disagree, and 1—Strongly Disagree. The Cronbach alpha for all the variables in the instrument is above 0.9 indicating good reliability (Table 1).

Table 1. Alpha Cronbach coefficient values of the variables.

Component	Alpha Cronbach (α)
Students' perception on the use of humour by teachers	0.957
Students' preferences on the use of humour by teachers	0.936
Motivation	0.924
Overall	0.975

On the other hand, qualitative data were collected based on four semi-structured, one-to-one interviews. Galletta's (2013) work became the guide for the development of the interview questions. The guide included steps such as building rapport with participants, effective phrasing and timing of probing question. The interviews were conducted in the classroom after a mathematics class. The interview sessions were recorded and took approximately 30 minutes. As exploratory, mixed-method research, the interview prompts were developed based on the analysis of students' quantitative response. The interview was designed to gather inputs on how humour in teaching mathematics can increase students' motivation (Table 2 shows semi-structured interview questions). The framework that guided the qualitative analysis includes becoming familiar with the data, identifying main themes, indexing themes, coding themes, and mapping and charting themes for interpretive purposes (Ritchie & Spencer, 2002). Specifically, this research used open, axial, and selective coding to organize and interpret interview data. Researchers gathered both quantitative and qualitative responses to answer the main research questions and compare participants' responses to check for disconfirming evidence and discrepancies. Besides that, data triangulation was carried out across participants to see the reliability and validity of the survey data. Lastly, peer review was also used in order to verify and explore the meaning of participants' responses.

4. Results & Discussions

Comparison of Students' Perception and Preferences on the Use of Humour Practices in Mathematics

There are three sub-domains for the construct of students' perception and preferences on the use of humour practices which are i) teacher interaction, ii) teacher emotions, and iii) teaching materials, and Table 3 displays the comparative mean and standard deviation for both constructs.

The findings show that the overall mean for students' perceptions ($M = 3.40$; $SD = 0.87$) is lower than students' preferences ($M = 4.20$; $SD = 0.60$). The result shows that there is a gap between students' perceptions and preferences towards the use of humour in mathematics class. This illustrates that students are more likely to be engaged in the class if their teachers use humour in teaching Mathematics.

The results also indicate that the variable of teacher's emotions has the highest

Table 2. Semi-structured interview questions.

Interview Questions	
1	Do you feel motivated when you learn Mathematics in the classroom?
2	What is your motivation level to learn Mathematics?
3	Do you think the use of humour in learning can enhance your motivation?
4	How does the use of humour in learning mathematics increase your motivation?

mean in the students' preference scale ($M = 4.13$; $SD = 0.54$) and students perception scale ($M = 3.41$; $SD = 0.81$) among the others variable. These results show that teacher's positive emotions play a crucial role in teaching mathematics as it can influence the students to learn maths. If we compare between students' perception scale and students' preference scale respectively, we can conclude that students' preference scale is higher than students' perception scale. This result reveals that teachers are poor at expressing positive emotions in the context of mathematics classroom. In other words, the findings indicate that students like teachers who display positive emotions such cheerful, humorous and joy.

Moreover, the findings show that teacher interaction for students' preference scale ($M = 4.06$; $SD = 0.70$) is higher than student perception' scale ($M = 3.25$; $SD = 0.85$). Meanwhile, students reported that teaching material for students' preference scale ($M = 3.27$; $SD = 1.04$) are almost similar to students' perception scale ($M = 3.14$; $SD = 1.08$). These results show that students reported that mathematic teachers rarely practiced humour in their daily interaction. It means that teachers are only focusing on subject matter. Interestingly, students prefer teachers who are humours especially in the context of social interaction. By using teaching material which contains humour as well as interaction embedded with humour, teachers are able to quickly gauge how many of students are actually with them. If they do not laugh and enjoy the class while the humour or jokes are really funny, it shows that the students are confused with the teacher's explanation about a mathematical concept or they have psychological issues such as maths anxiety, tension or other problems.

Correlation between the Use of Humour Practices and Students' Motivation

Table 4 shows the correlation between the use of humour practices and student's motivation. The result shows that there is a positive significant relationship between humour practices and student's motivation. It means that teachers who practice humour in teaching mathematics are associated with the

Table 3. Comparison of Students' Perception and Preferences on the Use of Humour in Mathematics.

Variable	Students' Perception Scale		Students' Preferences Scale	
	Mean	Std. Dev. (SD)	Mean	Std. Dev. (SD)
Teachers' Positive Emotions	3.45	0.81	4.13	0.54
Teachers' Interaction	3.25	0.85	4.06	0.70
Teaching Materials	3.14	1.08	3.27	1.04
Total	3.30	0.87	4.20	0.54

Table 4. Correlation between the use of humour practices and student's motivation.

Variable	Motivation
Humour in Mathematics	0.668*

*Significant values $p < 0.05$.

increase of students' motivation.

In order to support and further elaborate on the findings, the themes, which are based on the semi-structured interview, were analysed. The findings for question 1 reveal that all of the respondents report that they are less motivated to learn mathematics. In other words, they are not interested in the teaching session to the point where their problems manifest as bad behaviours such as avoiding class, copying their friends' homework as to avoid being scolded and not engage in the teaching session.

Besides that, the respondents have revealed, in question 2, the factors that influence their motivation include items such as the difficulty to master the subject matter, weak mastery of the basic concepts in mathematics, teachers who are always serious and show little cheerfulness in their lesson, unfriendly interaction with the teachers and what little interaction they have is limited to the mathematics lesson only. This affects the emotional development in students whereby they are not interested in learning maths, they feel anxious to learn and they give up easily. For example, respondents 5 and 6 both state that they do not feel interested to continue their studies in fields that are related to mathematics. This affects the students' choice of career as they will not choose any career that requires the application of mathematics.

Moreover, question 3 explains that the respondents agree with the idea of using of humour in learning can indeed affect the motivation of students to learn maths. For the purpose of uncovering more information, the researcher asks question 4 to the respondents in order to obtain their opinion of how humour can increase their motivation. Curiously, respondents 1 and 2 explain that the use of humour can create a fun learning environment and a positive learning experience. Additionally, respondents 3 and 6 also state that the use of humour in teaching includes the use of funny utterances, cheerful emotional expressions, teaching materials which contain humour and engaging activities for students to participate in. Students' engagement can be observed by looking at students' activeness in class, being able to give opinions when the teacher is teaching and has high motivation to learn. The implication of students' engagement is the ability to stimulate their cognition and challenge their minds to solve problems in mathematics.

5. Conclusion

A fun learning session created with the use of humour in the lesson can help reduce maths anxiety among students. The findings reveal that they enjoy it if the maths lesson contains humour in it. That being said, the reality in the classroom is that teachers do not practice humour in the maths lesson. The findings in this study show that humour in teaching support and encourage the teaching and leaning processes among students in maths class. This is because the use of humour, in the form of displaying emotion, teacher interaction and teaching materials, can create a conducive learning environment and reduce stress. Hence, this

research proposes a reform in terms of the teacher's instruction and students' motivation management which will contribute to the overall performance of the students. If the teachers practice humour in teaching mathematics, it will give off the sense that the teacher is approachable thus reducing the gap between teachers and students. This is because a lesson which contains humour will influence the level of engagement in students. Therefore, the use of humour in teaching can make the learning environment become more encouraging, satisfying and enjoyable for students to engage in it.

All in all, findings of this study put forward the concept of a mathematics lesson which contains humour does indeed affect students' motivation to learn said subject. This means that the use of humour in teaching mathematics is relevant and possible to be implemented in class. A number of previous studies support this research which explains that the use of humour can make the class become cheerful shown by the laughter of students thus creating a fun learning environment. This practice can help students to feel happier and become more focused in class. Furthermore, previous studies have shown that the use of humour piques students' interest and increases their motivation to learn. This, in turn, will change the problem of learning mathematics from a negative mood to a positive one hence reducing maths anxiety. Not only that humour can also assist students to maintain attention to the teaching session and understand something difficult and complex. This is because using analogies or explanations which contain humour will attract students' attention to comprehend the content, generate the will to solve a mathematics problem and increase positive emotions.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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