

A STATISTICAL ANALYSIS OF MATHEMATICS ANXIETY AND MATHEMATICS PERFORMANCE

Norhatta Mohd
Suriana Ismail
Wan Iman Wan Salim
Ajhar bin Ahmad

ABSTRACT

Math anxiety is regarded as a serious educational issue since it has an impact on students' emotions, thoughts, and behavior, according to previous studies. Therefore, this research intends to investigate the impact of mathematics anxiety on the performance of mathematics among foundation students at a private institution in Malaysia. For this study, 127 students were chosen as participants. The survey instrument was administered online, and the participants were selected using the convenient sampling technique. The questionnaire included demographic information and sections related to mathematics anxiety, such as self-efficacy factors, grade analysis factors, future factors, and in-class & assignment factors. The results of the questionnaire, along with the students' final mathematics grades, were entered into the SPSS program, where the data were analyzed using descriptive analysis, Pearson correlation, T-test, and ANOVA. The major finding of this study indicates that there is a significant relationship between mathematics anxiety and mathematics performance. This situation is particularly apparent among students who experience difficulties with mathematics. In addition, the results also reveal a significant difference in students' math performance based on their level of math anxiety, shedding light on how this concern affects their mathematics performance. Therefore, students' levels of math anxiety and how the worry affected their mathematics performance. However, the results indicate that there is no gender difference in mathematics anxiety. With this study outcome, more research should be done to broaden the knowledge of anxiety in mathematics to improve students' mathematics performance. In light of these conflicting results, practical implications and possible future research directions are discussed.

Keywords: Mathematics anxiety, mathematics performance, foundation students

INTRODUCTION

Anxiety in the realm of mathematics has emerged as a prominent subject of research among many researchers today. It is characterized as a mixed feeling of anxiety and tension experienced by individuals when grappling with mathematical challenges, be it within academic or day-to-day scenarios (Tobias, 1995). The undeniable influence of mathematical anxiety on learners' endeavors to comprehend diverse tiers of mathematical concepts cannot be overstated. Given its ubiquity in essential activities like currency conversion during international travels, prudent management of financial accounts, and the meticulous tracking of cash inflows over temporal spans, mathematics assumes a pivotal role in the routines of individuals. Consequently, its inclusion as a fundamental subject matter from the early stages of schooling is important. Nonetheless, many individuals confront increased stress and apprehension when confronted with mathematical problem-solving tasks. These instances, commonly referred to as "math anxiety," predominantly impact individuals who have encountered challenges with mathematical problem-solving both during their academic years and into adulthood. Such a notion sparks curiosity within the research community, prompting active investigations into matters such as the underlying causes of initial instances of math anxiety, the intricate mechanisms governing math anxiety within the human brain, and the formulation of effective treatment methodologies tailored to individuals grappling with math anxiety.

Most individuals are likely to encounter a strong feeling of nervousness when faced with a mathematical problem. This sensation can be identified as math anxiety. While nervousness is a common reaction to a daunting situation, anxiety can sometimes be subconscious. In other words, people might be experiencing feelings of anxiety without recognizing their presence or understanding the underlying cause. Physical indicators of anxiety, such as a racing heart and persistent perspiration, might manifest, but, normally, that individuals who feel anxious as they solve a mathematical problem may not know the actual reason for feeling so. Nonetheless, those dealing with math anxiety usually are aware of their limited capabilities for solving mathematical problems, which demotivates them to engage in mathematical activities. This inclination also leads individuals to avoid scenarios that involve mathematical problem-solving. Math anxiety pushes children and young adults to be less skillful in math as the future mathematical development of youngsters depends on raising their self-efficacy in arithmetic and confidence in learning math (Kyaruzi, 2023). Math anxiety not only hinders young individuals from cultivating proficient math skills, but it also presents challenges in their professional and daily life contexts during adulthood due to its persistence (Wu et al., 2016). The resulting disinterest and aversion to Mathematics can consequently hinder holistic personal growth and impede the pursuit of careers related to Science, Technology, Engineering, and Mathematics (STEM). The secret to economic progress and security in the country is in enhancing the teaching of science, technology, engineering, and mathematics (Bacovic, 2022).

Math anxiety is when feelings of anxiety and stress get in the way while trying to solve math problems. Anxiety related to mathematics is a psychological condition that typically arises during instruction and learning in the areas of problem-solving and assessment (Mabandos & Moneva, 2020). It is also a state of tension, worry, or fear that affects how well students learn the subject (Naseek, 2021). People who experience higher levels of math anxiety tend to take fewer math courses compared to those who aren't as anxious about math (Levine, 1995; Ashcraft & Kirk, 2001). As a result, those with more math anxiety are more likely to

avoid pursuing careers in STEM fields. Additionally, students might struggle to handle situations that make them feel scared because of past bad experiences with math. However, educators use various methods to create a positive learning environment that reduces the pressure and stress when learning math. This helps lower math anxiety and improve how well students do in math overall (Miller & Mitchell 1994).

According to a study, some students may be capable of doing well on their schoolwork, but not if the final evaluation is finished and they receive a failing grade (Zakaria & Nordin, 1998). Even while there may be other causes that contribute to this situation, math anxiousness is perhaps one of the more logical ones. Such a study has added to more preliminary research knowledge about this topic because there hasn't been much local research done on it (Zakaria & Nordin, 1998). Lack of confidence in one's ability to solve mathematical problems is believed to be the main cause of mathematics anxiety (Stuart, 2000). This has been a barrier for many people, from elementary school through higher education, and it seems to be a lifelong difficulty for some even to efficiently work with daily life routines that may involve mathematical concepts in general (Oxford & Vordick, 2006).

It is crucial to address the problem of math anxiety because it has an impact on students' overall academic performance (Ching, 2017). It is also possible to conclude that students' low accomplishment in mathematics is not due to their inability to understand the material, but rather to their concern about it, which slows down their capacity to reason through problems (Blazer, 2011). Since everyone encounters circumstances where they must be able to solve a mathematical problem on the spot, especially when learning in a classroom, mathematics anxiety may be a problem that arises in daily life. For instance, answering assessment questions, holding impromptu 'question and answer' sessions during lectures, and other such learning assessments (Ramirez et.al., 2018).

In Universiti Kuala Lumpur Malaysian Institute of Information Technology (UniKL MIIT) foundation center, mathematics is one of the subjects offered in various programs as a gateway for students to better prepare themselves with the necessary skills and useful knowledge that can be applied in their profession while continuing their studies in the future. Math skills are particularly important for students if they intend to enroll in a technical program, so it is necessary to investigate math anxiety and its relationship with math academic performance among undergraduate students at UniK. These lead to the following objectives of this study:

- 1) To determine the relationship between math anxiety and the academic performance of students in mathematics;
- 2) To explore the differences in math anxiety of students according to gender;
- 3) To investigate the differences in students' math performance based on their level of math anxiety.

By addressing these objectives, the study aims to provide UniKL lecturers with comprehensively knowledge to understand the factors affecting students' math performance and implement effective strategies to support their learning and reduce math anxiety.

The Pearson Correlation test is used to investigate objective 1. To investigate objective 2, a T-test will be conducted to determine if there is a statistically significant mean difference between gender and mathematics. Finally, to examine objective 3, an ANOVA F-test will be conducted to determine if the difference between low and high mathematics performance and mathematics anxiety is statistically significant.

PAST STUDIES ON MATH ANXIETY

Since mathematics is a topic that must be taught in both primary and secondary schools in Malaysia and is especially crucial for students enrolled in the scientific stream, its significance has been well-established throughout human civilization. However, given its complexity, it seems to be a subject that many students are generally hesitant about. Since mathematics is a required subject in the majority of Malaysian schools, if not all, students may suffer heightened anxiety as a result of poor academic performance in the subject because it is frequently regarded as a challenging one (Ali & Hassan, 2019).

Despite its importance and practical applications, mathematics performance has never been good globally (Ester, 2022). Students must overcome mathematics anxiety because the condition may have an impact on their academic performance (Stuart, 2000). According to studies, high school pupils who are less self-assured than their peers are more likely to exhibit anxiousness and some degree of discomfort as a result of math anxiety (Escalera-Chávez et.al., 2016). Like the above, students who perform poorly in mathematics necessarily can understand mathematical concepts; rather, their low performance is more likely the result of mathematics anxiety, which may have hampered their ability to solve mathematical issues (Blazer, 2011). Schools, meanwhile, have neglected to recognize math anxiety as a potential contributor to kids' mental breakdowns when learning mathematics (Siebers, 2015).

A specific level of academic success is regarded as being very significant because it is an essential requirement for students to get admitted to a college, university, or graduate program. Students will have a better chance of being accepted into more prestigious institutions if their academic performance is at least deemed satisfactory, but an unsatisfactory performance could result in them losing that chance or, in the worst-case scenario, prevent them from continuing their education at all. However, it is claimed that schools may bear a greater share of the blame in this regard since they do not view mathematics anxiety as a potential contributing factor to students' subpar academic performance in mathematics. (Siebers, 2015).

On the other hand, conventional methods of instruction might potentially be a factor in math anxiety. The influence of mathematics anxiety in relation to motivation and achievement among matriculation students, students with greater levels of mathematics anxiety have significantly lower scores in Mathematics (Zakaria et.al., 2012). This seems to be supported by several other studies which similarly suggest that higher achieving students are less anxious (Tella, 2007).

There is a strong association between math achievement and math anxiety, according to earlier research, which suggests that reducing math anxiety can increase arithmetic achievement. That is, pupils who perform poorly in mathematics may be more likely to avoid the subject in the future.

It has been found that students' performance in mathematics is directly correlated with their level of numerical anxiety, with anxious students performing better on exams, in quizzes, and when they tackle difficult mathematical problems than less anxious students (Seng, 2015). The study also shows that students' levels of anxiety are higher when engaging in daily activities than when engaging in simple processes that could result in numerical anxiety (Seng, 2015).

As a result, it is thought that students who experience more math anxiety are more likely to perform poorly academically in mathematics (Pantoja et.al., 2020). High math anxiety levels among students are more likely to be accompanied by negative self-perceptions of their abilities (Arem, 2009). For instance, while solving a quantitative problem involving numbers and mathematical ideas, they frequently exhibit lower levels of confidence. Numerous studies have discovered a link between math anxiety and gender, with some suggesting that female students may experience more arithmetic anxiety than their male counterparts (Karimi & Venkatesen, 2009; Khatoon & Mahmood, 2010). When comparing the scores of the two genders in terms of math anxiety, it was found that female students often had higher levels of math anxiety than their male counterparts (Prahmana et.al., 2019). In a similar vein, a recent study revealed that female students experience higher levels of arithmetic anxiety than male students (Ali & Hassan, 2019).

On the contrary, several studies claim that there is no significant relationship between genders and math anxiety (Marsh & Tapia, 2002; Elenchothy, 2007). Based on the results obtained, there was no significant difference in math anxiety scores between male students and their female counterparts, although the average score of male students was generally higher than that of female students. This shows that regardless of gender, students have similar math anxiety in math problem-solving situations.

PURPOSE

The main purpose of this study is to determine if there is a significant relationship between math anxiety and math academic performance. Second, this study also aims to find out if there is a significant relationship between a) gender-based math performance and b) math performance based on math anxiety level.

SCOPE AND LIMITATION OF STUDY

This study is specifically aimed at UniKL MIIT 2nd semester foundation students as a subject group, which consisted of 127 students from different backgrounds. Their performance in math is assessed, especially the level of math anxiety. The variables considered in the study are gender, math grades in the 1st semester, place or location of the residential area, etc.

METHODOLOGY

This study used descriptive research to determine the relationship between math anxiety and math performance in the second semester of students at the Foundation Center, UniKL MIIT. 127 students participated in the study, of which 56 were females and 71 were males. The students were told that their participation in the study was completely voluntary and that the results of their participation would not affect their grades. In the stage of data collection, a questionnaire was applied, based on which all the necessary information and outputs were collected, which helped to determine the main objectives of the study. One of the most effective ways to collect information from respondents is the survey method (Tuckman, 1978). The survey instrument used in this study was adopted from the Mathematics Self-Efficacy and Anxiety Questionnaire (MSEAQ) (May, 2009). Cronbach's Alpha reliability analysis technique was used and the instrument shows high reliability with a total Cronbach's alpha score of 0.96 based on the pilot test. A Likert scale with responses ranging from "strongly disagree" to "strongly agree," which correspond to scores of 1 to 5, is also included in the poll. The total number of answers selected by the participant for each question was then added up to produce a final score. Higher scores on the scale used to measure math anxiety were associated with higher levels of math anxiety, while lower scores were associated with lower levels of arithmetic anxiety. The results of the questionnaire and the final mathematics grade of the students were the final input in the SPSS program, where the data were analyzed with descriptive analysis, Pearson correlation, T-test, and ANOVA test.

RESULT

Respondents

A total of 127 foundation program students make up the sample. The distribution of respondents by gender is shown in Figure 1. 56.44% of male students and 43.56% of female students participated in this survey.

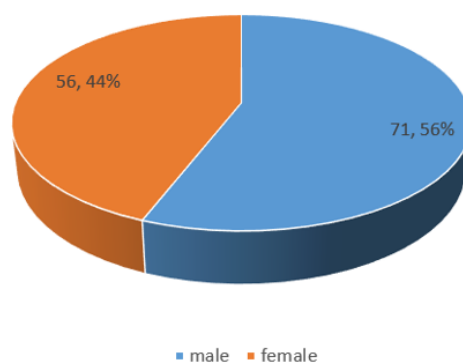


Fig. 1: The number of respondents who participated in the survey by gender.

Table I: The summary of the T-test for mathematics based on gender

Variables	t	Sig. (2 tailed)
SELF-EFFICACY	0.814	0.417
GRADE ANALYSIS FACTOR	1.942	0.054
FUTURE FACTOR	1.635	0.105
IN-CLASS & ASSIGNMENT FACTOR	1.409	0.161
OVERALL	1.632	0.105

Table 1 above lists the mean difference in math anxiety by gender, which was calculated using the T-test. The outcome showed no mean difference in math anxiety for all the constructs, such as self-efficacy, grade analyses factor, future factor, and in-class & assignment factor based on gender. For overall math anxiety, there is no significant difference according to gender ($t = 1.632$, $p > 0.05$). The result indicated that there was no proof of a significant link between the two variables.

B. Pearson Correlation

Table 2 below lists the results of the Pearson Correlation test between math anxiety and mathematics achievement.

Using a Pearson correlation, it was determined that there was a connection between students' mathematics performance and their mathematical anxiety. For all the math anxiety variables, the result indicated that there was a significant difference between math anxiety and the academic performance of students in mathematics ($r = 0.495$, $p < 0.01$). The relationship between the indicator of mathematics anxiety and mathematics performance shows that there are indicators of Mathematics anxiety that correlate positively to the performance of students in a mathematics course, but there are other indicators of Mathematics anxiety that contribute negatively and have no relation to the mathematics performance (Magnate, 2022).

Table II: A Pearson correlation test between math anxiety and mathematics performance

Factors	r	Sig. (2 tailed)
SELF-EFFICACY	0.552	0.01
GRADE ANALYSIS FACTOR	0.357	0.01
FUTURE FACTOR	0.418	0.01
IN-CLASS & ASSIGNMENT FACTOR	0.326	0.01
OVERALL	0.495	0.01

When examining students' levels of math anxiety and how that worry affected their mathematics performance, an ANOVA test was employed to compare outcomes.

Table III: ANOVA summary table of math anxiety level with level of mathematics performance

Variable	F	Sig. (2 tailed)
MATH ANXIETY	17.771	0.01

The ANOVA test revealed a significant difference between the students' anxiety level and math ability level ($F = 17.771$, $p < 0.01$). We can conclude that students' mathematics performance is positively correlated with their level of math anxiety. Researchers have discovered a link between test anxiety and math anxiety, which suggests that students' nervousness during exams also plays a role in their poor math performance. Math anxiety prevents students from thinking positively about mathematics, which leads to low self-esteem, dissatisfaction, and academic failure. (Nathan & Jakob, 2020). This occurs when students don't study sufficiently for the test, which causes them to become afraid and ultimately fail the test (Bentil, 2020).

DISCUSSION AND CONCLUSION

Anxiety can be worrying when anxiety is disproportionately high or unhealthy, but it can be a completely normal and healthy feeling that all people experience at some point in their lives. According to various experts, there can be several types of anxiety depending on the nature of the situation, and one of the most common types is math anxiety. Educators should be cautious about the effects of math anxiety on students' math performance. They should apply the necessary knowledge and skills that can help minimize students' fear of mathematics. One of the most effective methods known is to create a stimulating learning environment that can arouse excitement and motivation in students. It is also important that lecturers implement interactive teaching that can help create a conducive learning environment. As a fully face-to-face lesson was implemented, which is seen in the analysis that there is a significant relationship between math anxiety and students' math performance, and as a result, a significant difference in math performance based on their anxiety levels was observed, online lessons could change students' math anxiety. Such finding contradicts with the studies of (Karimi & Venkatesen, 2009; Kangar et.al., 2010). However, the results consistent with those who found that students with higher levels of anxiety tend to have lower math scores and vice versa (Zakaria & Nordin, 2008; Zakaria et.al., 2012; Seng, 2015). Furthermore, this study shows that there is no mean difference between math anxiety and mathematics performance according to gender. However, this finding contradicts findings where there were significant gender differences in math anxiety, with female students having higher math anxiety than males. (Karimi & Venkatesen, 2009; Khatoun & Mahmood, 2010; Prahmana et.al., 2019).

Although students cannot interact with their lecturers and friends face to face, online learning gives them more flexibility. They can learn at their own pace with their lecturers and peers through discussion and forums, yet they are not burdened with memorizing all kinds of mathematical formulas and most importantly, the pressure to answer questions in front of the camera. Taking an online class also means a shorter commute to class, which means less time spent on transportation and more time spent at home, and thus much more convenient learning.

As a result of this study, more research should be done to address math anxiety to improve students' math performance. However, it is recommended that future studies consider variables other than those investigated in this study. One possible focus could be the factors affecting math anxiety and their impact on math performance. This is crucial in the future so that students can overcome their fear and thus learn mathematics more effectively and achieve better academic results. However, it is recommended to obtain a larger sample of the institution for a larger study in the future, which should be extended to all UniKL campuses to support these findings and obtain more accurate results.

In summary, the results of this study are beneficial for UniKL lecturers to better understand what factors are affecting students' math performance and how to help them. By offering academic and social counseling, lecturers can create a positive and supportive environment that addresses students' anxieties. Early interventions can also be implemented to prevent students' math skills from getting worse and to boost their understanding and confidence in the subject. As a result, this study provides useful information for lecturers to support students' academic journey and improve their success in math.

REFERENCES

- Ali, N. A. M., & Hassan, N. C. (2019). Mathematics anxiety and mathematics motivation among students in the Faculty of Science of a public university in Malaysia. *International Journal of Academic Research in Progressive Education and Development*, 8, 952-963.
- Arem, C. A. (2009). *Conquering Math Anxiety* (3rd ed.). Belmont: Cengage Learning.
- Ashcraft, M. H., & Kirk, E. P. (2001). The relationships among working memory, math anxiety, and performance. *Journal of Experimental Psychology: General*, 130, 224-237.
- Bacovic, M., Andrijasevic, Z., & Pejovic, B. (2022). STEM education and growth in Europe. *J. Knowl. Econ.*, 13, 2348-2371. doi:10.1007/s13132-021-00817-7
- Bentil, J. (2020). Examination anxiety as a correlate of junior high school pupils' academic performance in the Effutu Municipality of Ghana. *Advances in Social Sciences Research Journal*, 7(1), 10-23.
- Blazer, C. (2011). Strategies for reducing math anxiety. *Information Capsule, Research Services, Miami-Dade County Public Schools*, 1102.
- Ching, B. H.-H. (2017). Mathematics anxiety and working memory: Longitudinal associations with mathematical performance in Chinese children. *Contemporary Educational Psychology*, 51, 99–113. <https://doi.org/10.1016/j.cedpsych.2017.06.006>
- Elenchothy, D. (2007). *Kebimbangan matematik dan hubungannya dengan pencapaian pelajar tingkatan empat di daerah Klang* [M.Sc. thesis]. Universiti Putra Malaysia.
- Escalera-Chávez, M. E., Moreno-García, E., García-Santillán, A., & Rojas-Kramer, C. A. (2016). Factors that promote anxiety toward math on high school students. *Eurasia Journal of Mathematics, Science and Technology Education*, 13, 189–199. <https://doi.org/10.12973/eurasia.2017.00611a>

- Salahot, E. D. (2022). The effects of mathematics anxiety on mathematics performance among secondary school students in Tanzania: A case of Arusha City Council. *International Journal of Scientific Research and Management*, 10(12), 425–436. <https://doi.org/10.18535/ijstrm/v10i12.m001>
- Kangar, M., Tarmizi, R. A., & Bayat, S. (2010). Relationship between mathematical thinking, mathematics anxiety, and mathematics attitudes among university students. *Procedia Social and Behavioral Sciences*, 8, 537–542. <https://doi.org/10.1016/j.sbspro.2010.12.074>
- Karimi, A., & Venkatesen, S. (2009). Mathematics anxiety, mathematics performance, and academic hardiness in high school students. *International Journal of Science and Mathematics Education*, 1, 33-37.
- Kyaruzi, F. (2023). Impact of gender on sources of students' self-efficacy in mathematics in Tanzanian secondary schools. *Int. J. Sch. Educ. Psychol.*, 11. doi:10.1080/21683603.2021.1945512
- Levine, G. (1995). Closing the gender gap: Focus on mathematics anxiety. *Contemporary Education*, 67, 42-45.
- Mabandos, S. M. Y., & Moneva, J. C. (2020). Students' mindset and level of anxiety for general mathematics among grade 11 students: A case of Jagobiao National High School, Philippines. *IRA International Journal of Education and Multidisciplinary Studies*, 16(1), 28. <https://doi.org/10.21013/jems.v16.n1.p6>
- Magnate, F. R. (2022). Relationship between mathematics performance and anxiety. *International Journal on Integrated Education*, 5(6), 385-389.
- Marsh, G. E., & Tapia, M. (2002). Feeling good about mathematics: Are there sex differences? Proceedings of the Annual Meeting of the Mid-South Educational Research Association, 1-12.
- May, D. K. (2009). *Mathematics self-efficacy and anxiety questionnaire* [PhD Dissertation]. University of Georgia.
- Miller, L. D., & Mitchell, C. E. (1994). Mathematics anxiety and alternative methods of evaluation. *Journal of Instructional Psychology*, 21, 353-358.
- Naseek, P. (2021). Mathematics anxiety among students: Causes and remedies. *Ijariie*, 7(3), 3185–3191.
- Nathan, O. M., & Jacob, K. O. (2020). Mathematical modeling and analysis of mathematics anxiety behavior on mathematics performance in Kenya. *Journal of Advances in Mathematics and Computer Science*, 35(4), 46-62.
- Oxford, J., & Vordick, T. (2006). Math anxiety at Tarleton State University: An empirical report. Tarleton State University.
- Pantoja, N., Schaeffer, M. W., Rozek, C. S., Beilock, S. L., & Levine, S. C. (2020). Children's math anxiety predicts their math achievement over and above a key foundational math skill. *Journal of Cognition and Development*, pp. 1–20. <https://doi.org/10.1080/15248372.2020.1832098>
- Prahmana, R. C. I., Rully, C. I. P., Sutanti, T., Wibawa, A. P., & Diponegoro, A. M. (2019). Mathematical anxiety among engineering students. *Journal of Mathematics Education*, 8, 179-188. p-ISSN 2089-6867. <https://doi.org/10.22460/infinity.v8i2.p179-188>.
- Ramirez, G., Hooper, S. Y., Kersting, N. B., Ferguson, R., & Yeager, D. (2018). Teacher math anxiety relates to adolescent students' math achievement. *AERA Open*, 4. <https://doi.org/10.1177/2332858418756052>
- Seng, E. L. K. (2015). The influence of pre-university students' mathematics test anxiety and numerical anxiety on mathematics achievement. *International Education Studies*, 8, 162. <https://doi.org/10.5539/ies>
- Siebers, W. M. (2015). *The relationship between math anxiety and student achievement of middle school students* [Doctoral dissertation]. Colorado State University, Fort Collins, Colorado.
- Stuart, V. (2000). Math curse or math anxiety? *Teaching Children Mathematics*, 6, 330–335.
- Tella, A. (2007). Work motivation, job satisfaction, and organisational commitment of library personnel in academic and research libraries in Oyo State, Nigeria. In C.O. Ayeni, & S.O. Popoola (Eds.), *Library Philosophy and Practice 2007*.
- Tobias, S. (1995). *Overcoming Math Anxiety* (1st ed.). New York: W. W. Norton.
- Tuckman, B. W. (1978). *Conducting Educational Research*. New York: Harcourt Brace Jovanovich Inc.
- Wu, S. S., Barth, M., Amin, H., Malcarne, V., & Menon, V. (2012). Math anxiety in second and third graders and its relation to mathematics achievement. *Frontiers in Psychology*, 3, 1–11.
- Zakaria, E., & Nordin, N. M. (2008). The effects of mathematics anxiety on matriculation students as related to motivation and achievement. *Eurasia Journal of Mathematics, Science and Technology Education*, 4, 27-30.
- Zakaria, E., Mohd Zain, N., Ahmad, N., & Ayu Erlina. (2012). Mathematics anxiety and achievement among secondary school students. *American Journal of Applied Sciences*, 9, 1828-1832.

Norhatta Mohd
Universiti Kuala Lumpur (UniKL),
Malaysian Institute of Information Technology, 54000 Kuala Lumpur, Malaysia
Email: norhatta@unikl.edu.my

Suriana Ismail
Universiti Kuala Lumpur (UniKL),
Malaysian Institute of Information Technology, 54000 Kuala Lumpur, Malaysia
Email: suriana@unikl.edu.my

Wan Iman Wan Salim
Universiti Kuala Lumpur (UniKL),
Malaysia France Institute, 34650 Bandar Baru Bangi, Selangor, Malaysia
Email: waniman@unikl.edu.my

Ajhar bin Ahmad
Universiti Kuala Lumpur (UniKL),
Malaysia France Institute, 34650 Bandar Baru Bangi, Selangor, Malaysia
Email: ajhar@unikl.edu.my