



MATHEMATICS MAKE STUDENTS CONFUSED AND ANXIOUS: A COMPARISONS BETWEEN AUSTRALIA, INDONESIA, AND SINGAPORE IN THE 2015 TIMSS

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Abstract. The main purpose of this study is to find out the perceptions about Mathematics that confuse and anxious 2015 TIMSS participants in Australia, Indonesia, and Singapore. The data in this study is the 2015 TIMSS data that has been released to the public and has available for development purpose research. The research method used is quantitative method. The population of this study is students' perceptions of Mathematics subject that confuse and worry students aged 15 years in three countries who are studying in 2015, while the sample is 15-year-old students' perceptions in these countries. The data in this study were in the form of questionnaires which were answered by 16599 students from these three countries. Based on the results of the analysis of variance, there is a significant difference ($P < 0,000$) on students' perceptions about mathematics subject that confuse and worry students in these three countries (Sig. 0,000). The reliability of students' abilities is the same, Australia = 0.74, Indonesia = 0.75; and Singapura = 0.75. The conclusion is most students in these three countries stated "disagree a lot" about mathematics make students confuse and worry.

Keywords: mathematics, confused, anxious, TIMSS.

INTRODUCTION

Indonesia participated in the international study of Trends in International Mathematics and Science Study (TIMSS) to see the achievements of mathematics learning outcomes at the junior high school level, the results up to the period of 2015 are always below the average

international score, Table 1 (Mullis, et al. 2012). Mathematical problems in the TIMSS studies measure the level of students' abilities from knowing facts, procedures or concepts, to using them to solve simple problems to problems that require high reasoning (Wardhani & Rumiati, 2011).

Table 1. TIMSS Indonesia Results

Year	Rank	Participants	Indonesian Scores Average	International Scores Average
2003	35	46 Countries	411	467
2007	36	49 Countries	397	500
2011	38	42 Countries	368	500
2015	44	49 Countries	397	500

This condition of Indonesian students happens due to experience working on the TIMSS problem model that demands high

reasoning. Based on Table 1, Indonesia already has 3 to 4 experiences following TIMSS but the results are still below the International average.

These results worse students perception that Mathematics is considered as a difficult subject. The students believe that mathematics makes students confused and anxious because it always relates to numbers, formulas, and calculations. The impact is the students refuse to learn it, unless required as the demands of learning. Such initial thinking will obviously affect the mastery of mathematics in individual students because previously there was a fear of not being able to understand mathematics. They were not interested in mathematics even before try it. Moreover, this condition is shown by seniors students who say that mathematics is difficult because it makes students confused and anxious. This affect the perception of other students. They assume that seniors have more experience in learning mathematics. As a result, there is a fear of inability to understand the material because there are unfavourable opinions from seniors who had studied these materials. These opinions last for generations to believe that mathematics is indeed a difficult subject.

Like disease, (students' perceptions about mathematics are difficult because it makes students confused and anxious), can such diseases be cured so they are not contagious? What is the perception of students in neighboring country of Indonesia, such as in Australia and Singapore? Do they also have the same perception as students in Indonesia. In 2015 (Mullis et al. 2015), the TIMSS scores of Australia and Singapore are above the international average (Mean 500). Australia is ranked 28 (Mean 517), while Singapore is ranked first (Mean 618). Therefore, this study will compare the percentage of students' perception of Mathematics to confuse and worry students in: Australia, Indonesia and Singapore. Based on 2015 TIMSS data in the form of a questionnaire (most agree, bit agree, less agree, most disagree) with questions: (1) math makes me confused and (2) math makes me nervous will be analyzed student perceptions in the three countries .

According to Mohamed and Tarmizi (2010) the issue "students' perceptions of mathematics are difficult because they make students confused and anxious" is a problem in

developing countries, even a global problem. Until now there are still students who express negative feelings towards Mathematics (Jenkins, 2006). They do not realize that mathematics actually supports science, technology, economics and economic development for careers and the future, but Mathematics is always seen as a difficult subject (Mason, Stacey, and Burton, 2010).

Many factors affect students' perceptions about Mathematics that as a difficult subject because they make students confused and anxious, namely on aspects: social, cognitive, cultural, and emotional factors (Brown, et al., 2020). Confused and anxious mean "tense and unpleasant feelings that block the ability to deal with numbers or mathematics in various situations" (O'Leary, Fitzpatrick, & Hallett, 2017, p.1) and relate to: knowledge, skills, and attitude / character (García Santillán, Martínez-Rodríguez, & Santana, 2018). Finally, student learning is incomplete or in accordance with the target competency, so that feelings of worry and fear of failure appear (Mehdinezhad & Bamari, 2015). This condition has an impact on the effectivity and efficiency of mathematics learning in the classroom (Jáquez, 2018; JusticiaGaliano et al., 2016). For example the quality of mathematics learning in Bantaeng Regency, South Sulawesi is in the lowest category based on research findings from the South Sulawesi Education Quality Assurance Institute in 2011. It affects students not to be involved in the mathematics learning process (Tompong and Jailani, 2019).

Anxiety about Mathematics can also affect many things, namely: student performance in class, grade promotion, graduation exam, and even their decision about the career path to be followed (Maloney, Schaeffer, & Beilock, 2013). In addition, research by Calvo et al. (2017) have shown that students tend to be more anxious about mathematics, develop less self-confidence, have poor belief in their ability to cope with tasks, and feel less skilled (Calvo, Cascante, Valdés-Ayala, & Quesada, 2017). Students who have high levels of confusion and anxiety will have lower levels of mathematics achievement

(Ho et al., 2000). According to Stuart (2000), "lack of confidence when working in mathematical situations is a major cause of mathematics anxiety. Students who experience higher levels of anxiety will exhibit negative attitudes towards Mathematics (Tella, 2007). Although the type of student error in answering a math test is a misstatement to be a dominant error rather than a misunderstanding, calculation errors, and procedural errors. The dominant factor that causes students to make mistakes in answering mathematical tests is that most students do not understand how to solve the problem of inequality, determine the equation of quadratic factors, determine members of the set completion, problems about graphics, and problems that require the ability to interpret language into mathematical models (Shantika and Istiyono, 2019). However, according to Singh, Granville, and Dika (2002), motivation plays an important role to overcome mathematics anxiety. In learning mathematics, making students actively involved in learning is important in learning (Fahmi, 2020). This is proven even though there is a change in policy in Indonesia that the national exam (UN) does not determine student graduation, but this policy does not affect: (1) teacher motivation, (2) student motivation, (3) parent support, (4) school preparation, and (5) students' anxiety about UN 2019 (Safari, 2019). The fundamental implication of this finding is that there is a need for learning innovations to improve mathematics learning outcomes towards the 21st century (kusaeri and Ridho, 2019).

From the various descriptions above, the problem in this study is whether there are differences in students' perceptions of Mathematics that are confusing and anxious for students in Australia, Indonesia, and Singapore, who participate in 2015 TIMSS.

RESEARCH METHOD

The research method is quantitative method. The basis for using this method is adapted to the main purpose of this study, among others, is to obtain facts from the symptoms that exist and look for facts factually based on this research data. The data in this study use the 2015 TIMSS data that has been released to the public and has been permitted to be used for research development purposes. The study population was students' perceptions of Mathematics which confused and worried 15-year-old students in three countries (Australia, Indonesia, Singapore) who were studying in 2015, while the sample was students' perceptions of Mathematics which confused and worried 15-year-old students in these three countries. The sample is students who are taking the TIMSS 2015 in these three countries. The data in this study were questionnaires in the form of questions (most agree, bit agree, less agree, most disagree) which were answered 16599 students from 3 countries. The topics asked in the questionnaire related to: (1) math makes me confused and (2) math makes me nervous. The complete data as in Table 1 below.

Table 1. List of TIMSS 2015 Participants in Three Countries and Number of Students

Country	Frequency	Percent	Valid Percent	Cumulative Percent
Australia	6057	36,5	36,5	36,5
Indonesia	4025	24,2	24,2	60,7
Singapura	6517	39,3	39,3	100,0
Total	16599	100,0	100,0	

The analytical method used in this study is the analysis of variance. This analysis is used to calculate differences in the level of students' perception of mathematics making students confused and anxious. So that the results of the analysis of this study can be obtained accurately,

then all data in this study are processed or analyzed using the SPSS 22.00 program. To find out the relationship between variables in the three countries and the ability of their students, the data were analyzed using the Mplus and Rasch Model (Winsteps).

RESEARCH RESULT

Based on the percentage of students who have filled out the questionnaire 16.599 students from 3 countries is as follows.

Table 2. Percentage of Students' Perceptions of Mathematics Making Students Confused

		Country			Total
		AUSTRALIA	INDONESIA	SINGAPURA	
Agree a lot	Count	1034	747	1302	3083
	% of Total	6,3%	4,5%	7,9%	18,6%
Agree a little	Count	1429	1039	1737	4205
	% of Total	8,6%	6,3%	10,5%	25,4%
Disagree a little	Count	1317	594	1426	3337
	% of Total	8,0%	3,6%	8,6%	20,2%
Disagree a lot	Count	2127	1508	2032	5667
	% of Total	12,9%	9,1%	12,3%	34,3%
Omitted or invalid	Count	102	134	16	252
	% of Total	0,6%	0,8%	0,1%	1,5%
	Count	6009	4022	6513	16544
	% of Total	36,3%	24,3%	39,4%	100,0%

Tables 2 and 3 inform that students' perceptions of mathematics leave students confused and anxious that most students in three

countries state Australia's "most disagree" 12.9% and 15.1%; Indonesia 9.1% and 10.1%; and Singapore 12.3% and 11.5%.

Table 3. Percentage of Students' Perceptions of Mathematics Making Students Worried

		Country			Total
		AUSTRALIA	INDONESIA	SINGAPURA	
Agree a lot	Count	823	692	1326	2841
	% of Total	5,0%	4,2%	8,0%	17,2%
Agree a little	Count	1322	963	1800	4085
	% of Total	8,0%	5,8%	10,9%	24,7%
Disagree a little	Count	1242	556	1426	3224
	% of Total	7,5%	3,4%	8,6%	19,5%
Disagree a lot	Count	2494	1667	1897	6058
	% of Total	15,1%	10,1%	11,5%	36,6%
Omitted or invalid	Count	128	144	64	336
	% of Total	0,8%	0,9%	0,4%	2,0%
	Count	6009	4022	6513	16544
	% of Total	36,3%	24,3%	39,4%	100,0%

Table 4. Results of Analysis of Variance on Students' Perception from Three Countries

No.	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
1.	Math make me confused	243,834	2	121,917	66,301	,000
2.	Math make me nervous	573,219	2	286,609	144,288	,000

Table 4 informs that based on the results of the analysis of variance shows that there are differences in the perceptions of students in Math make students confused and nervous ($P < 0.05$).

Highest to lowest perception order (Figure 1) is: Indonesia is almost the same as Australia, then Singapore.

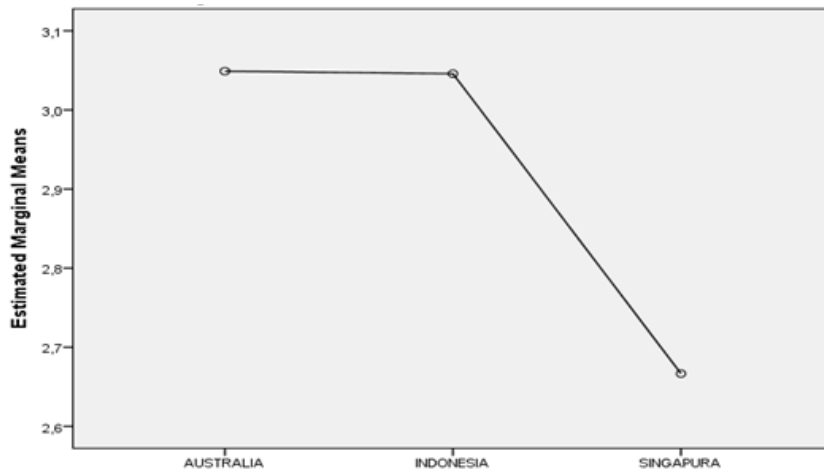


Figure 1: Perceptions of Students to Math Make Student Nervous

DISCUSSION

The conclusion of this study is the difference in the level of students' perception of mathematics makes students confused and nervous is proven ($P < 0.05$). Most students in three countries (Australia, Indonesia, Singapore)

stated "most disagree" about Mathematics making students confused and nervous.

Figure 2 below is the 2015 TIMSS data from three countries analyzed with the Mionion 8.2 program with the following as follows.

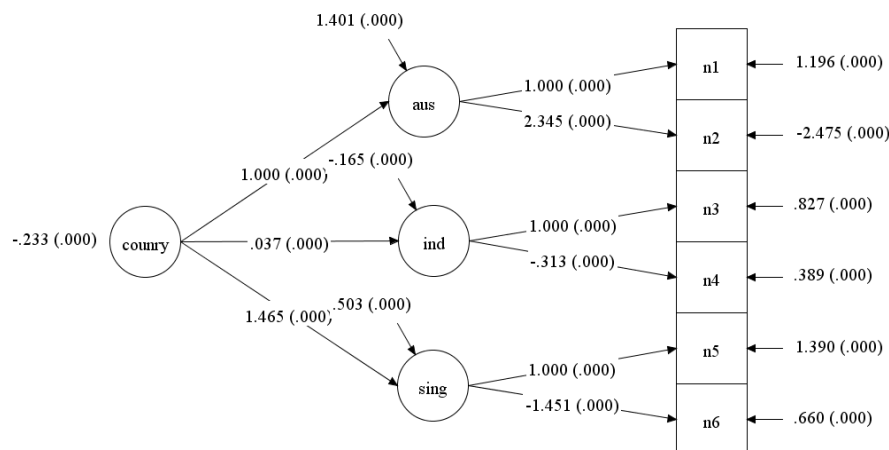


Figure 2: Relationship of Students' Perceptions of Mathematics

Based on Figure 2, students' perceptions about mathematics make students' confuse and nervous ranging from the most of the smallest are students from the country (1) Indonesia, loading factor 0.037; (2) Australia, loading factor of 1.00; (3) Singapore, loading factor of 1,465. Students from all three countries have the same perception that is mathematics making students' confuse, loading factor is 1.00. The

different thing is nervous perception, starting from the most up to the smallest are students from countries: (1) Indonesia, the loading factor is -0.313; (2) Singapore, the loading factor is -1.451; (3) Australia, loading factor 2,345. To determine the reliability of the person, this data was analyzed with the Rusch Model, the results of which are as in Table 5 below.

Table 5. Results of Rusch Model Analysis

PERSON	AUSTRALIA	INDONESIA	SINGAPURA
N	6008	4021	6512
Mean	5.9	6.0	5.3
SD	2.3	2.9	2.1
RSME	1.22	1.26	1.43
SEPARATION	1.71	1.75	1.72
Reliability	.74	.75	.75

The reliability of students' abilities in the three countries is the same, Australia = 0.74, Indonesia = 0.75; and Singapura = 0.75.

Based on the results of the Mplus Figure 2 analysis, the highest student confusion and anxiety were Indonesian (loading factor 0.037), Australia loading factor 1,000), and Singapore (loading factor 1,465). These results are consistent with the 2015 TIMSS acquisition rank: Indonesia ranks 44 (Mean 397), Australia ranks 28 (Mean 517), while Singapore ranks first (Mean 618). These results are in line with the results of research by Ho et al. (2000) that students who have high levels of confusion and anxiety will have lower levels of mathematics achievement. Research by Calvo et al. (2017) also show the same thing that students who tend to be more anxious about mathematics, develop less self-confidence, have poor belief in their ability to handle assignments, and feel less skilled (Calvo, Cascante, Valdés-Ayala, & Quesada, 2017). Students who experience higher levels of anxiety will show negative attitudes towards Mathematics (Tella, 2007). So, the higher the student's ability to understand the subject matter, the lower the level of student anxiety about the subject matter (Safari, 2019a). But international data can be biased. According to Rahmawati (2018) the sample bias should make caution in interpreting the ranking of PISA results because the length of study makes a difference. Countries that are dominated by 10-year students tend to benefit from countries where more students have only studied for 9 years. In all countries, students with a 10 year length of study are higher than students with a 9 year length of study, and apply to the results of the PISA 2003 to PISA 2015. Ironically the results of data analysis show the proportion of 10 year old students studying between countries is not the same, so it has the potential to be biased on the results of achievements. Nevertheless, there are some positive activities that can be followed in

classroom learning. The teachers in countries which above the PISA average often provide feedback and provide better reading material to their students compared to teachers in countries below the PISA average. Because student learning dependency in countries above the PISA average is higher than students in countries below the PISA average, feedback frequencies are considered unnecessary (Safari, 2020). According to Rahdiani, et al. (2019) that students who are interested in other countries' cultures have UNBK scores slightly higher compared to their peers. Based on the results of the 2011 TIMSS data analysis, (1) Indonesian students are less accustomed to working on questions in the application and reasoning of the cognitive realm, especially in questions that are constructed-response; (2) Indonesian students are less accustomed to working on questions that require more than one question completion process; (3) misconceptions among Indonesian students about arithmetic operations (+, -, x, :), which should be done first; and (4) Indonesian students have more difficulty in doing algebraic operations than numeric operations (Fahmi and Purwati, 2019). According to Rahmawati and Nizam (2018), the low number of Indonesian students in the TIMSS study, students were distracted and chose the same mathematics problem distractor. The students were distracted to point out the misconception of place values. Students are confused between place values, place numbers, and number values. It is recommended to use the context of everyday life for the topic of place values in textbooks so that students easily understand the correct concepts. These results indicate that academic integrity moderately affects the welfare of students in school. This assumes that personal factors such as academic integrity are needed in supporting the quality of effective learning, because learning outcomes depend on the

mental and psychological condition of the students themselves (Ramdani and Prakoso, 2019).

To overcome mathematics anxiety, according to Singh, Granville, and Dika (2002), the students concerned are given positive motivation continuously. Avoid phrases that can discourage students, such as "I hate mathematics", "Mathematics is a difficult subject", and "I will never understand mathematics" (Whyte & Anthony, 2012). Mathematical texts are very difficult at UN 2018 (Arsiah, 2018) Such statements can easily influence the perception of their peers and should be avoided, encouraging statements such as "I believe that I will succeed in mathematics" from peers can increase student confidence in mathematics (Usher & Pajares, 2009 Peer behavior in daily interactions can have an effect on students' mathematics anxiety (Garba et al, 2020) Newman et al. (2017) peers can positively or negatively influence student learning Spaniol (2017) states that some students link mathematics anxiety with a lack of peers in mathematics, and as such, a lack of student success is one of the factors that is causing it even math anxiety. According to Yurt (2014), peer sharing of negative experiences about mathematics influences students' success and confidence in mathematics.

Ajeng prabandari's research results (2019) show that: (1) mathematics learning difficulties experienced by students due to students' negative perceptions of mathematics learning, (2) the factors that cause mathematics learning difficulties come from internal factors (lack of students having intelligence, learning motivation, and health body) and external factors (use of learning media and family situations), (3) solutions that can be used to reduce the difficulty of learning mathematics include changing students' negative perceptions of mathematics learning into positive, using learning media, increasing the practice of questions and establishing cooperation with parents.

The same study was conducted by Senjaya et al. (2017) about the difficulty of students in learning mathematics is (a) students'

misconceptions about something that will be determined; (b) students' ignorance of concepts; (c) students who do not accurately write mathematical symbols (language); (d) student inaccuracies in mathematical calculations. Meanwhile, the factors that cause students to experience difficulty in learning lines and material angles are divided into two factors, namely internal and external factors. Internal factors (in students) that cause learning difficulties in the lines and angles of learning material are students not interested in learning mathematics and how / student learning habits. Meanwhile, external factors (outside of students) of students' learning difficulties in learning mathematics from the material lines and angles of SMPN 4 Sindang are seen through two aspects, namely factors of the school environment and family environment (home). (1) Difficulties experienced by students in learning the material lines and angles, namely: (a) Students' lack of understanding of the specific problem; (b) The subject's lack of understanding of the concept of lines and angles; (c) Subject inaccuracy in writing mathematical symbols (languages); (d) Inaccuracy of students in mathematical calculations. (2) Factors that cause students learning difficulties in learning material lines and angles are divided into two, namely internal and external factors. Internal factors (in students) that cause learning difficulties in learning lines and angles material that is the lack of student interest in learning mathematics and poor learning habits that lead to results that are not optimal.

Meanwhile, external factors (outside of students) students' learning difficulties in learning mathematics on the material lines and angles of SMPN 4 Sindang viewed through 2 aspects, namely factors of the school environment and family environment (home). Viewed from the school environment factors, several factors that can cause students difficulty learning mathematics on lines and angles, namely: (a) Less effective learning time; (b) Learning Media; (c) monotonous learning methods; (d) the relationship between teachers and students is classified as less harmonious; (e)

the relationship between students and students classified as less harmonious; (f) Students' excessive activities in organizations. Meanwhile, viewed from family environmental factors. Several factors can cause students to have difficulty learning mathematics in lines and angles, namely: (a) A low level of parent educational background; (b) lack of parents' attention to their children's learning activities at home; (c) low family economic situation; (d) the atmosphere of a busy or even creepy home for students.

Many factors must be addressed to overcome the level of mathematical anxiety. According to Brown et al. (2020) the factors that must be addressed are: (1) the factors that cause mathematical anxiety in daily interactions in class, (2) exploring interactions among peers, which can worsen and intensify anxiety or reduce anxiety toward mathematics, and (3) minimize math anxiety among students. Mathematics learning must be accompanied by interesting media, then the material and mathematical concepts taught must be adjusted to the abilities and thinking of students (Ismayani, 2010; Nikiforidou & Pange, 2010; Suryana, 2016). One of the mathematical abilities that can be developed in early childhood education is the ability to count (Ismayani, 2010; Susanto, 2011; Suyanto, 2008). Including readiness to attend primary school, which parents and teachers consider as academic readiness, so teachers and parents emphasize the importance of reading, writing and arithmetic skills (Nurhayati, 2018).

A lot of description problems are used, because the reliability of the mathematical description test can detect the level of student understanding of the subject matter concept, especially material from the central angle, arc length, sector area, which can only be answered correctly by 17.58% of students (Fahmi, 2020a). There is a significant difference between students who are used to and not accustomed in answering essay questions to the results of the 2018 National Examination (Sig. 0,000) (Safari, 2019b). Parents also need to be actively involved in this reinforcement, because parents who spend

more time helping and checking their children's homework, have children who achieve higher scores on mathematics and science (Paramitha and Safari, 2019). This depends on the educational background and work of each student. The educational background (Safari, 2018) and the work background of students' parents have a significant influence on the results of the 2018 UN (Safari, 2019c). Many teachers and parents of students who use the assignment method through worksheets to be able to increase student activities in mathematics teaching and learning activities such as: student attendance, student activity in following the course of the lesson, student participation in asking questions, student activity in answering teacher questions, and student activity nature answers questions (Rumiyati, 2011: 425). Input for math problem books, questions should start from the easy, medium, and difficult. The question book should be arranged by grouping the chapters following the realm of material as in TIMSS, namely numbers, geometry, algebra, data, and opportunities. The question book for students does not need to be written about the realm of the material, main topic, and cognitive realm. Writing multiple choice questions is better not to use question sentences, but rather by making statements that contain points, both in the middle or at the end of the sentence (Rudhito and Prasetyo, 2016: 88-97).

CONCLUSION

Based on all the descriptions above, the results of the study can be concluded with the findings and suggestions as follows.

- 1) Students' perception of mathematics makes students confused and worried that the majority of students in three countries state Australia's "most disagree" 12.9% and 15.1%; Indonesia 9.1% and 10.1%; and Singapore 12.3% and 11.5%.
- 2) Based on the results of analysis of variance shows that there are differences in students' perceptions of mathematics making students confused and nervous ($P < 0.05$). The highest order to the lowest perception of students is:

Indonesia is almost the same as Australia, then Singapore.

- 3) Based on the results of the analysis with Mplus shows that students' perceptions about Mathematics make students' confuse and nervous ranging from the most of the smallest are students from the country (a) Indonesia, loading factor 0.037; (b) Australia, loading a factor of 1.00; (c) Singapore, loading a factor of 1,465. Students from all three countries have the same perception that is mathematics making students' confuse, loading factor is 1.00. The different thing is nervous perception, starting from the most up to the smallest are students from countries: (a) Indonesia, loading factor is -0.313; (b) Singapore, loading factor -1.451; (c) Australia, loading factor 2,345.
- 4) Based on the analysis of the Rasch (Winsteps) model, it shows that the reliability of students' abilities in the three countries is the same, Australia = 0.74, Indonesia = 0.75; and Singapura = 0.75.

SUGGESTION

Based on the research results above, there are important suggestions like the following. We should be thankful for the TIMSS, which is one of the index measurements of Indonesia's numeracy literacy level compared to other countries. It is hoped that with the TIMSS, we can improve the education method because through education can contribute to increasing the interest in numeracy literacy, making Indonesian citizens smart so that they can improve the economy and prosperity later. For this reason, there are a number of specific suggestions for teachers at school so that Mathematics is preferred by students at school through the answers to the following questions. (1) How can I make mathematics more fun for students? (2) How can I ease their mental barriers when facing math lessons? (3) What methods can I try to help them in learning. (4) What games can we play? (5) What resources are available to help in the lesson progres?

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REFERENCES

Books

- Ismayani, A. (2010). *Fun Math With 2 Children Mengenal Matematika Kepada Anak Usia 2 Hingga 6 Tahun Melalui Beragam Aktivitas*. Jakarta: PT Alex Media Komputindo.
- Mason, J., Stacey, K. & Burton, L. (2010). *Thinking Mathematically (2nd edition)*. Edinburgh: Pearson.
- Mullis, I. V. S., Martin, M. O., Foy, P., & Arora, A. (2012). *TIMSS 2011 international result in mathematics*. Chesnut Hills, MA: Boston College.
- Mullis, I.V.S.; Martin, MO.; Foy, P.; and Hooper, M. (2015). *TIMSS 2015 International Results in Mathematics*. IEA, TIMSS & PIRLS: International Study Center, Lynch School of Education, Boston College.
- Suryana, D. (2016). *Pendidikan Anak Usia Dini Stimulasi & Aspek Perkembangan Anak*. Jakarta: Kencana.
- Susanto, A. (2011). *Perkembangan Anak Usia Dini Pengantar dalam Berbagai Aspeknya*. Jakarta: Kencana.
- Tella, A. (2007). *Work Motivation, Job Satisfaction, and Organisational Commitment of Library Personnel in Academic and Research Libraries in Oyo State, Nigeria*, C.O. Ayeni, S.O. Popoola. *Library Philosophy and Practice 2007: (April)*.

- Wardhani, S & Rumiati. (2011). Instrumen penilaian hasil belajar matematika SMP: Belajar dari PISA dan TIMSS. Yogyakarta: Pusat Pengembangan dan Pemberdayaan Pendidik dan Tenaga Kependidikan (PPPPTK) Matematika.
- Journal**
- Arsiah, Z. (2018). *The Characteristics of Mathematic Items for Senior High School Grade in National Examination 2018. Proceeding Book Vol. 1 of 1st ICEAP: The 1st International Conference on Educational Assessment and Policy 2018. Page 44-54. DOI: <https://doi.org/10.26499/iceap.v1i1.72>.*
- Brown, JLI; Ortiz-Padilla, M; and Soto-Varela, R. (2020). Does Mathematical Anxiety Differ Cross-Culturally? *JOURNAL OF NEW APPROACHES IN EDUCATIONAL RESEARCH* 2020, VOL. 9, NO. 1, 126-136, e-ISSN: 2254-7339
<https://doi.org/10.7821/naer.2020.1.464>.
- Calvo, E. A., Cascante, L. G. M., Valdés-Ayala, Z. S., & Quesada, S. S. (2017). Estudio de la ansiedad matemática en la educación media costarricense / Mathematical Anxiety in Secondary Education in Costa Rica. *Revista Electrónica de Investigación Educativa*, 19(1), 35–45.
- Fahmi dan Purwati, R. (2019). *Refleksi Diri Untuk Memperbaiki Hasil Belajar Berdasarkan Hasil TIMSS. IJEA: Indonesian Journal of Educational Assessment. Vol. 2, No. 1 (2019) Page 1-15. DOI: <https://doi.org/10.26499/ijea.v2i1.13>.*
- Fahmi. (2020). Membangun Kemampuan Matematis, Menciptakan Variasi Pengajaran & Meningkatkan Keterlibatan Siswa dalam Pembelajaran di Kelas. *ASESMEN: Media Informasi dan Komunikasi Penilaian Pendidikan*, Volume 17, No. 1, April 2020. Halaman 28-35. ISSN 9772089057114; <http://asesmen.kemdikbud.go.id>.
- Fahmi. (2020a). *Daya Serap Materi Pelajaran dan Reliabilitas Tes Matematika Bentuk Soal Uraian. IJEA: Indonesian Journal of Educational Assessment. Vol. 3, No. 1 (2020) Page 42-51. DOI: <https://doi.org/10.26499/ijea.v3i1.58>.*
- Garba, A.; Ismail, N.; Osman, S.; Rameli, MRM. (2020). Exploring Peer Effect on Mathematics Anxiety among Secondary School Students of Sokoto State, Nigeria through Photovoice Approach. *EURASIA Journal of Mathematics, Science and Technology Education*, 2020, 16(2), em1815 ISSN:1305-8223 (online), <https://doi.org/10.29333/ejmste/112622>.
- García-Santillán, A., Martínez-Rodríguez, V., & Santana, J. C. (2018). Psychometric Properties of the RMARS Scale in High School Students. *European Journal of Contemporary Education*, 7(1), 97–117. <https://doi.org/10.13187/ejced.2018.1.97>
- Ho, H. Z., Senturk, D., Lam, A. G., Zimmer, J. S., Hong, S., Okamoto, Y., Chiu, S. Y., Nakazawa, Y., & Wang, C. P. (2000). The affective and cognitive dimensions of math anxiety: A crossnational study. *Journal for Research in Mathematics Education*, 31, 362-379. <https://doi.org/10.24320/redie.2017.19.1.849>
- Jáquez, L. F. H. (2018). Perfil sociodemográfico y académico en estudiantes universitarios respecto a su autoeficacia académica percibida. *Psicogente*, 21(39), 35–49. <https://doi.org/10.17081/psico.21.39.2820>
- Justicia-Galiano, M. J., Pelegrina, S., Lechuga, M. T., Gutiérrez-Palma, N., Martín-Puga, E. M., & Lendínez, C. (2016). Math anxiety and its relationship to inhibitory abilities and perceived emotional intelligence / Ansiedad matemática y su relación con capacidades inhibitorias e inteligencia emocional percibida. *Anales de Psicología*, 1, 125–125. <https://doi.org/10.6018/analesps.32.1.194891>

- Kusaeri and Ridho, A. (2019). *Learning outcome of mathematics and science: Features of Indonesian madrasah students. Jurnal Penelitian dan Evaluasi Pendidikan, Vol. 23, No. 1 (2019). Page 95-105. DOI: <https://doi.org/10.21831/pep.v23i1.24881>.*
- Mehdinezhad, V., & Bamari, Z. (2015). The Relationship between Test Anxiety, Epistemological Beliefs and Problem Solving among Students. *Journal of New Approaches in Educational Research, 4(1), 2-8. <https://doi.org/10.7821/naer.2015.1.97>*
- Mohamed, S. H., & Tarmizi, R. A. (2010). Anxiety in Mathematics Learning Among Secondary School Learners: A Comparative Study between Tanzania and Malaysia. *Procedia - Social and Behavioral Sciences 8:498-504.*
- Newman, R. S., Schwager, M. T., Newman, R. S., & Schwager, M. T. (2017). Students' Perceptions of the Teacher and Classmates in Relation to Reported Help-Seeking in Math Class. *The University of Chicago Press Journal, 94(1), 3-17.*
- Nurhayati,W. (2018). Transisi ke Sekolah Dasar dan Kesiapan Bersekolah: Studi Eksplorasi pada Orang Tua, Guru, dan Anak. *Proceeding Book of 1 st NCEAP June 28, 2018 (The 1st National Conference on Educational Assessment and Polidy). Page 31-37. DOI:<https://doi.org/10.26499/nceap.v1i1.64>.*
- O'Leary, K., Fitzpatrick, C. L., & Hallett, D. (2017). Math anxiety is related to some, but not all, experiences with math. *Frontiers in Psychology, 8, 1-14. <https://doi.org/10.3389/fpsyg.2017.02067>*
- Paramitha, S. dan Safari. (2019). Dampak Pendampingan Dalam Mengerjakan PR dan Kebiasaan Orangtua Membaca Terhadap Capaian Akademik Anak Dalam Timss 2015. *IJEA: Indonesian Journal of Educational Assessment. Vol. 2, No. 2 (2019) Page 50-55. DOI: <https://doi.org/10.26499/ijea.v2i2.35>*
- Rahdiani, D; Maulida, NS; and Nuraini. (2019). Students' Cultural Interest: An Overview Of Computer-Based National Examination (Unbk) 2019. *IJEA: Indonesian Journal of Educational Assessment. Vol. 2, No. 2 (2019) Page 32-39 DOI: <https://doi.org/10.26499/ijea.v2i2.33>*
- Rahmawati dan Nizam. (2018). Meningkatkan Capaian Matematika Siswa Indonesia: Kajian Kesalahan Konsep Nilai Tempat. *IJEA: Indonesian Journal of Educational Assessment. Vol. 1, No. 1 (2019) Page 1-10. DOI: <https://doi.org/10.26499/ijea.v1i1.3>.*
- Rahmawati. (2018). Memaknai Hasil PISA Melalui Perspektif Kelemahan Sampel: Saatnya Beranjak dari Paradigma Ranking. *Proceeding Book of 1 st NCEAP June 28, 2018 (The 1st National Conference on Educational Assessment and Polidy). Page 78-88. DOI:<https://doi.org/10.26499/nceap.v1i1.68>.*
- Ramdani, Z. dan Prakoso, BH. (2019). Integritas Akademik: Prediktor Kesejahteraan Siswa di Sekolah. *IJEA: Indonesian Journal of Educational Assessment. Vol. 2, No. 1 (2019) Page 29-40. DOI: <https://doi.org/10.26499/ijea.v2i1.14>*
- Rudhito, M. Andy dan Prasetyi, D. Arif Budi. (2016). Pengembangan Soal Matematika Model TIMSS untuk Mendukung Pemberlajaran Matematika SMP Kelas VII Kurikulum 2013. *CAKRAWALA PENDIDIKAN: Jurnal Ilmiah Pendidikan, Februari 2016 Th. XXXV, No. 1. ISSN 0216-1370. Yogyakarta: Lembaga Pengembangan dan Penjaminan Mutu Pendidikan (LPPMP),UNY.*

- Rumiyati. (2011). Penerapan Metode Penugasan Melalui LKS untuk Meningkatkan Aktivitas Siswa dalam Kegiatan Belajar Mengajar Matematika Materi Pokok Persamaan Kuadrat. *Jurnal Pendidikan Widyatama*, Vol. 8, No. 2, Juni 2011. ISSN 1693-8631. Semarang: Lembaga Penjaminan Mutu Pendidikan (LPMP) Jawa Tengah.
- Safari. (2018). Pengaruh Tingkat Pendidikan Orang Tua terhadap Hasil UN SMP 2018. *IJEA: Indonesian Journal of Educational Assessment*. Vol. 1, No. 1 (2018) Page 11-20 DOI: <https://doi.org/10.26499/ijea.v1i2.8>.
- Safari. (2019). Pengaruh Pendapat Guru Tentang Dampak Perubahan Kebijakan UN Tidak Sebagai Penentu Kelulusan Siswa terhadap Hasil UN 2019. *ASESMEN: Media Informasi dan Komunikasi Penilaian Pendidikan*, Volume 16, No. 2, Agustus 2019. Halaman 42-50. ISSN 9772089057114; <http://asesmen.kemdikbud.go.id>.
- Safari. (2019a). Perasaan Siswa SMP Dalam Menghadapi UNBK 2018. *ASESMEN: Media Informasi dan Komunikasi Penilaian Pendidikan*, Volume 16, No. 1, April 2019. Halaman 45-54. ISSN 9772089057114; <http://asesmen.kemdikbud.go.id>
- Safari. (2019b). Pengaruh Kebiasaan Siswa Menjawab Soal Uraian Terhadap Hasil UN 2018. *IJEA: Indonesian Journal of Educational Assessment*. Vol. 2, No. 2 (2019) Page 20-31. DOI: <https://doi.org/10.26499/ijea.v2i2.32>
- Safari. (2019c). Hasil UN SMP 2018 Ditinjau dari Latar Belakang pekerjaan Orang Tua Siswa. *IJEA: Indonesian Journal of Educational Assessment*. Vol. 2, No. 1 (2019) Page 17-28. DOI: <https://doi.org/10.26499/ijea.v2i1.16>.
- Safari. (2020). Students' Perception of Teacher Guidance on Reading Learning Based on Results of PISA 2018. *IJEA: Indonesian Journal of Educational Assessment*. Vol. 3, No. 1 (2020) Page 32-41. DOI: <https://doi.org/10.26499/ijea.v3i1.56>.
- Senjaya, A. J., Sudirman, & Supriyatno. (2017). Kesulitan-kesulitan Siswa dalam Mempelajari Matematika pada Materi Garis dan Sudut di SMPN 4 Sindang. *Mathline: Jurnal Matematika dan Pendidikan Matematika*, Vol.2, No.1, 11-28
- Shantika, EG and Istiyono, E. (2019). A Diagnosis of Students' Errors in Answering the Mathematics Test in Senior High School. *Jurnal Penelitian dan Evaluasi Pendidikan*, Vol. 23, No. 2 (2019). Page 129-143. DOI: <https://doi.org/10.21831/pep.v23i2.16370>.
- Singh, K., Granville, M., & Dika, S. (2002). Mathematics and Science Achievement: Effects of Motivation, Interest, and Academic Engagement. *Journal of Educational Research*, 95, 323-332.
- Stuart, V. B. (2000). Math curse or math anxiety? Teaching Children Mathematics, ERICS; v6 n5 p330-35.
- Tompong, BNKJ and Jailani. (2019). An evaluation of mathematics learning program at primary education using Countenance Stake Evaluation model. *Jurnal Penelitian dan Evaluasi Pendidikan*, Vol. 23, No. 2 (2019). Page 156-169. DOI: <https://doi.org/10.21831/pep.v23i2.16473>
- Usher, E. L., & Pajares, F. (2009). Sources of self-efficacy in mathematics : A validation study. *Contemporary Educational Psychology*, 34(1), 89-101. <https://doi.org/10.1016/j.cedpsych.2008.09.002>

- Whyte, J., & Anthony, G. (2012). Maths Anxiety: The Fear Factor in the Mathematics Classroom. *New Zealand Journal of Teachers' ...*, 9(1), 6-15. Retrieved from http://www.teacherswork.ac.nz/journal/volume_9_issue1/whyte.pdf
- Yurt, E. (2014). The Predictive Power of Self-Efficacy Sources for Mathematics Achievement, 39(176), 159-169. <https://doi.org/10.15390/EB.2014.3443>.

Thesis and Disertation

- Ajengprabandari, K. (2019). Analisis Faktor-Faktor Penyebab Kesulitan Belajar Pada Mata Pelajaran Matematika Di Kelas Iv Sd Negeri 4 Genengadal. Skripsi. Pendidikan Guru Sekolah Dasar Fakultas Keguruan Dan Ilmu Pendidikan Universitas Muhammadiyah Surakarta.

- Spaniol, S. R. (2017). Students' Mathematics Self-Efficacy, Anxiety, and Course Level at a Community College. ProQuest Dissertations and Theses, 105. Retrieved from <https://search.proquest.com/docview/1904509452?accountid=15272>

Web Page

- Jenkins, N. (2006). Factors that Influence Mathematics Attitudes. Summative Projects for MA Degree. 8. <http://digitalcommons.unl.edu/mathmidsummative/8>
- Nikiforidou , Z., & Pange, J. (2010). “ Shoes and Squares ”: A computerbased probabilistic game for preschoolers, 2, 3150–3154. <https://doi.org/10.1016/j.sbspro.2010.03.480>