



Qurmatica-Based Learning as a Solution to Reduce Anxiety For Students' Mathematics Phobias

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Abstract

Mathematics anxiety is an obstacle for students in carrying out mathematics learning, especially there are still students who think mathematics is a difficult and boring subject. The ability to understand mathematical concepts of each student is different. There are several influencing factors, one of which is the anxiety experienced by students when learning mathematics. Therefore, mathematics is one of the important lessons to be learned, not only students at school but also students who are studying in Islamic boarding schools. Some of the knowledge that students learn in Islamic boarding schools also requires mathematics. For example, when studying the science of zakat distribution, Faraid science, and the like. The students have applied the linkage of mathematical concepts with Islamic concepts studied by students in Islamic boarding schools. In this study, the data collection method used was a literature study. This method was used to obtain additional literature data from reference books regarding mathematics anxiety towards students. In fact, mathematics is a basic science that is important for the advancement of science and technology, and the concepts in learning mathematics are used in everyday life. The author tries to offer a solution to reduce the level of anxiety of students towards mathematics by conducting learning that integrates the Qur'an with mathematics using the Qurmatica method as a solution can be used to play and learn mathematics and to encourage students' enthusiasm in learning mathematics and students can reduce their mathematics anxiety.

INTRODUCTION

Mathematics is not just a lesson about counting like algebra and arithmetic, but mathematics is also a lesson to develop skills of reasoning, problem solving, and communication skills. Indicators of communication according to the Ontario Ministry of Education, namely (1) express and organize ideas and think mathematically (clarity expression, logical organization), using spoken language, visuals, and written forms (e.g. pictures, graphs, calculations, algebraic forms; materials in concrete form), (2) communication for different audiences (e.g. other students, teachers) and purposes (e.g. displaying data, justify completion, and express opinions mathematically) verbally, visually, and written, and (3) using conventions, vocabulary, and terms from mathematics (e.g. terms, symbols) orally, visually, and in writing [1]. In other words, mathematics has a very essential role for other sciences, especially science and technology. Science progress and technology that is so fast today can not be separated from the role of mathematics. May be said, Mathematics is the cornerstone of science and technology. Therefore mastering mathematics is one of the main roads leading to the development of science and technology technology in this country [2]. However, we can not deny the fact until now there are so many students in this country have difficulty in study mathematics. In fact, it is not uncommon for

mathematics to be considered a scary thing, avoided as can as possible. Such conditions will clearly hinder the mastery of mathematics [2], [3].

Understanding of mathematical concepts is needed by students to succeed in learning mathematics, this is same with the opinion from Fatqurhohman, one of the keys success in learning mathematics is mastery of concepts [4]. Understanding ability about the mathematical concept of each student is different. There are several factors that influence, one of which is the anxiety experienced by students when learning mathematics.

In general, research has shown that mathematics anxiety has a relevant implications for student's learning, hindering performance in mathematics's course [5] and influence future opportunities for involvement in mathematics [6]. Mathematics anxiety can arise by the ability of students who are lack in mathematics, the character of the mathematics's teacher, the model learning used by the teacher, mathematics difficulties and lack of self-confidence [7].

Mathematics is one of the most important sciences to learn. Not just for normally students, but also by student in Islamic boarding schools. But the fact, there are so many students of class XI at the Al-Ansor islamic boarding school of Manunggang Julu Village, Southeast Padangsidempuan District, experienced anxiety when studying mathematics [8]. Some of the knowledge that students learn at the Islamic boarding school is clearly need mathematics. Call it, for example when studying Faraid, Falak, Distribution of Zakat, or etc. So, there is no reason for the students not to enjoy (read: learn) mathematics [9].

The fact that at the Al-Ansor Desa Islamic boarding school, Manunggang Julu, Southeast Padangsidempuan District, there are so many class XI students who anxious when learning mathematics, assumes mathematics is a difficult subject. So in this case the researcher interested in providing solutions so the students at the islamic boarding school did not experience anxiety when learning mathematics [8]. Solution provided researcher to reduce students anxiety about mathematics is learning mathematics with the Qur'an's approach. Al-Qur'an approach is intended the students let open the Al-Qur'an as a reference when learning mathematics. How to pack the learning, the researcher formulate the Qurmatika method, by using the Qurmatika method learning design that combines the Al-Qur'an with mathematics. Qurmatika is solutions that can be used by students to encourage students enthusiasm in learning mathematics, because Qurmatika in practice can be used to play and learn mathematics in the same time. So that the students can reduce their anxiety about the mathematics lesson and increase the knowledge of the application of the Al-Qur'an for Mathematics.

METHOD

The method in this narrative review uses the method or literature approach (library research), in library research (library research), library search not just for the initial step of preparing a research design, but also for while at the same time utilizing library resources to obtain research data [10]. In literature research, there are four main characteristics that the author needs to pay attention to, including: First, that the writer or researcher is dealing directly with the Al-Qur'an and Mathematics problems or data literature, not with direct knowledge from the research area. Second, the library data is "ready to use" that means the researcher does not involved into the research area because researcher utilize with data sources in the library. Third, the data literature generally is a secondary source, that means the researcher obtains material or data from the second hand and not the original data from the first person in the research area. Fourth, the condition of library data is not

limited by space and time [10]. Based on the above, then the data collection in the study is carried out by reviewing and/or explore several journals, books, and video documentaries (both in print and in electronic) as well as other sources of data and or information considered relevant to the research or study.

RESULTS AND DISCUSSION

A. Mathematics in the Perspective of Santri

According to Pulungan states that mathematics is a subject less liked by students at school, especially in certain schools such as private madrasah (islamic boarding school) [8]. In islamic boarding schools, students experience anxiety, difficulties and hard to understand about mathematics lessons, even just hear the word of mathematics make students feels not good, it's because the discussion is always studying about things that relate with numbers so to learn it must be totally focus and requires thinking out loud and strong memory, both in calculations and use the formula.

Mathematics anxiety involves tense feeling and anxiety that affect various how to solve mathematics problems in real life and academic [11]–[13]. Not only student involvement in mathematics lessons at school as academic, but whatever the form of problems in daily life as long as associated with numbers, students will be anxious and tense. Anxiety is one of the reason why good interpersonal relationships are important in understanding mathematics. This is because anxiety can increase, subjective to each individual, and affect easy to understand or not [14]. Learning mathematics as part of learning activities in madrasa is still facing obstacles, mathematics subjects are considered non-essential in the madrasa institution. If we look deeper, there are so many roles of mathematics in Islamic Sharia syariah includes prayer, zakat, hajj, fasting, legacy and etc. If this matter socialized since early stage by the teacher as facilitator, it is certain the students assume that mathematics is identical with earth lessons without any relation with the afterlife will be no more, students will doing with a sense of pleasure, no fear, dare to face the difficulties of life with mathematicss based on Islamic values [15]–[17].

B. Reducing Santri's Anxiety towards Mathematicss with the Al-Qur'an Approach and Mathematics

According to Fathani, mathematics is a basic science that needed by the people in daily life, either direct or indirect [9]. Mathematics is also a science that cannot be separated from religion. This clearly the truth can be known from the verses of the Al-Qur'an relating to mathematics, among which are verses that talk about numbers, operations numbers, and counting.

Therefore, mathematics is one of the important subjects to learn, not just for students at school but also students who are studying at school Islamic boarding school. Some of the knowledge that students learn in Islamic boarding schools, need mathematics too. For example, when studying about zakat distribution, faraid, and etc. So in this case, the students have applied the concept linkage mathematics with Islamic concepts that studied by students in Islamic boarding school.

The task of the teacher, especially in Islamic boarding school is not easy, especially in the teaching of mathematics. Student anxiety towards mathematics is also the responsibility of the teacher in the boarding school to think more widely, so that some students who experience anxiety about mathematics learning can be reduced. Factors that affect student anxiety on mathematics can

be caused by several things, for example the learning media that unsupportive or not varied, the teaching methods of the teacher or clerics that so monotone, and etc. Therefore, the students who are studying at the Islamic boarding school should be given encouragement to learn mathematics such as media development learning. One of them is by developing learning media based on multimedia and in it contains Islamic concepts related to.

C. Qurmatica as a Solution for Students' Anxiety on Mathematics Lessons

A problem in mathematics raises challenge to solve that problem or question with creativity, experience, thought or imagination are needed [18]. A problem usually contains situations that encourage students to solve it but don't know what supposed to do to finish it. If student is not able to solve mathematics problem after being given a response by the teacher, so the teacher needs to take appropriate action as a trigger of students' thinking so they are able to make strategies to solve the mathematics al problem [19].

So for that, in improving the quality of learning mathematics is needed alternative efforts to improve outcomes in learning achievement. Qurmatica is a multimedia-based learning method. In the implementation of Qurmatica Requires computer skills to support the multimedia composing process.

1) Specifications of Qurmatica

Multimedia can be the tool or intermediary in the learning process. On design of Qurmatica learning, is very different from the media used in generally. Qurmatica's design is in the form of a monopoly game concept, the game is played by 2 to 4 people. In this case, the author has game concept to integrate the Al-Qur'an and Mathematics. In contrast to other's media learning that just provide mathematics material, but In the Qurmatica learning, the content concept of the material uses the formulation from Al-Qur'an and mathematics, which is used as a solution for students in overcoming anxiety about mathematics.



Picture 1. Qurmatica Display

In Qurmatica design view, it can be seen that there is a monopoly game concept. The game have 30 types of boxes:

- 1) The Question Box is a box that contains questions from Al-Qur'an for Mathematics, Al-Qur'an from Mathematicss and easy mathematics questions. There are 12 boxes containing 60 types of questions spread in the boxes. Can be seen in Picture 1 on the surprise box, Surpris, Neriman, and others are examples of question boxes. As Giving a name to the box that hoping can make student tenseless.
- 2) The box for reciting the Surah of the Al-Qur'an is a box where the player who occupies the box, must reading the surah that has been provided in the box. In the box for reading the Surah of the Al-Qur'an, it gives an advantage to the santri so that they do not always get questions about mathematicss.
- 3) Punishment Box is a box that contains punishment. Qurmatica already designing for this game can create a pleasure atmosphere and tenseless, so they can learn and play at the same time.

From the Qurmatica design, a material box is provided, all the teachers or clerics who is there, a place will be provided to edit the current material discussed. The contents of the box can be edited as desired. So the teachers or clerics in Islamic boarding schools can use Qurmatica according to mathematicss learning needs. In addition to these features, the game has a randomizer digital numbers and dialog boxes for the teachers or clerics for ask the attention from the students and can be directly typing in the dialog box and automatically save the text.



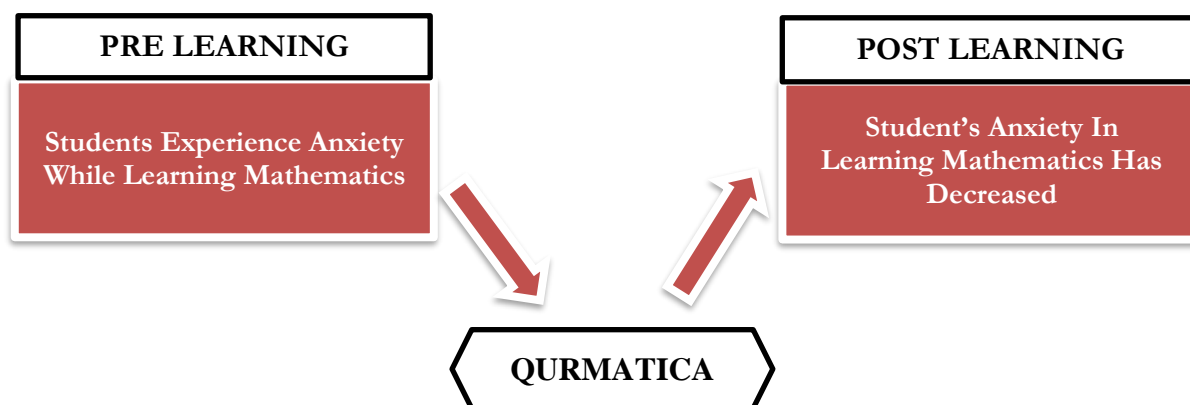
Picture 2. Display of Questions After The Player Occupies A Random Number Position

For instructions in the Qurmatica game, we can write in the dialog box on the initial screen next to the scrambler box.

2) Learning Syntax

Table 1. Steps to Apply Qurmatica Learning for Mathematicss Phobia Students

Implementation Stages	Cleric or teacher's activities	Student's activities
Socialization (reading the rules)	The teacher reads the rules games on learning Qurmatica.	Students listen and understand the rules of the game, if necessary students allowed to take notes.
Engagement (grouping)	The teacher divides the group according to the needs of students.	Students gather in groups which has been shared.
Exploration (group assignment)	The cleric or teacher tell there are 4 task for each in the group. Write questions, read out question, discuss or search the answers to questions that have been provided by Qurmatica in Al-Qur'an.	Students divide group assignments according to their amount.
Action (the first player to start rolling the dice)	The teacher provide space for students to press the P1 button, then for the group listed on the media that has been provided.	Representative from each group roll the dice.
Transformation (collaborative discussion) If the dice come out number of digits, players or member group, do according to the location occupied	The teacher arrange, pay attention, help and record the results of the group work.	<ul style="list-style-type: none"> - If in the question box, students discuss and find answers with the group in mathematicss and Al-Qur'an textbooks Qur'an. - If in the recitation box, then the surah can be represented by each group or read together. - If in the penalty box, then one group or the representative being execution of the punishment. The punishment way is depend and given by the teacher.
Reply Action (keep doing continuous max 5 turn)	The teacher arrange, pay attention, help and record the results of the group work.	Practice Qurmatica's learning process, the game will be a method to reducing students anxiety towards mathematicss.
Reflection (feed back and appraisal)	The teacher act as a facilitator.	Students with the teacher conclude about what they have been learned.



CONCLUSIONS AND SUGGESTIONS

From the facts revealed by Pulungan there are several students in Islamic boarding schools who experience anxiety when learn mathematics [8]. Anxiety when learning mathematics can occur due to several factors, including the lack of ability from students to learn mathematics, the character of the mathematicss teacher, the learning model used by teachers or educators, mathematics difficulties and lack of confidence [20]. Therefore, QurmatICA method is expected to reduce the level of students' anxiety toward mathematics. QurmatICA in practice is designed to be used to play and learn mathematics. Then QurmatICA method can be applied in Islamic boarding schools as a learning design that combines Al-Qur'an with mathematics to reduce the level of anxiety of students towards mathematics and to increase interest or attractiveness of students in learning mathematics.

REFERENCES

- [1] H. Sukoco and I. Suharjo, "Mathematics Self-Efficacy Scale Based on Computer," *Indonesian Journal of Mathematics Education*, vol. 2, no. 1, Art. no. 1, Apr. 2019, doi: 10.31002/ijome.v2i1.1248.
- [2] S. H. J., *Mengobarkan Api Matematika*. Sukabumi: CV Jejak, 2017.
- [3] M. S. Anwar, C. Choirudin, E. F. Ningsih, T. Dewi, and A. Maselena, "Developing an Interactive Mathematics Multimedia Learning Based on Ispring Presenter in Increasing Students' Interest in Learning Mathematics," *Al-Jabar: Jurnal Pendidikan Matematika*, vol. 10, no. 1, Art. no. 1, Jul. 2019, doi: 10.24042/ajpm.v10i1.4445.
- [4] F. Fatqurhohman, "Pemahaman Konsep Matematika Siswa Dalam Menyelesaikan Masalah Bangun Datar," *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, vol. 4, no. 2, Art. no. 2, Mar. 2016, doi: 10.25273/jipm.v4i2.847.
- [5] M. Anouti, S. Shehayeb, and M. Mchiek, "The Effect of Math Anxiety on Students' Performance in the Intermediate and Secondary Classes," *International Journal of Science and Research (IJSR)*, vol. 8, pp. 739–745, Jan. 2018, doi: 10.21275/ART20201161.
- [6] U. Xolocotzin, *Understanding Emotions in Mathematical Thinking and Learning*. Academic Press, 2017.
- [7] H. P. Susanto, "Analisis Hubungan Kecemasan, Aktivitas, dan Motivasi Berprestasi Dengan Hasil Belajar Matematika Siswa," *Beta: Jurnal Tadris Matematika*, vol. 9, no. 2, Art. no. 2, Dec. 2016, doi: 10.20414/betajtm.v9i2.10.

- [8] T. A. Pulungan, “Deskripsi Kecemasan Belajar Matematika (Mathematics Anxiety) Santriwati Madrasah Aliyah Swasta Pondok Pesantren Al-Ansor Manunggang Julu Kecamatan Padangsidimpuan Tenggara,” skripsi, IAIN Padangsidimpuan, 2018. Accessed: Jun. 29, 2021. [Online]. Available: <http://etd.iain-padangsidimpuan.ac.id/2297/>
- [9] A. H. Fathani, “Pembelajaran Matematika bagi Santri Pondok Pesantren Berbasis Kecerdasan Majemuk,” *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, vol. 2, no. 1, Art. no. 1, Apr. 2019, doi: 10.24176/anargya.v2i1.3043.
- [10] M. Zed, *Metode Penelitian Kepustakaan*. Jakarta: Yayasan Pustaka Obor Indonesia, 2014.
- [11] M. Suárez-Pellicioni, M. I. Núñez-Peña, and À. Colomé, “Math anxiety: A review of its cognitive consequences, psychophysiological correlates, and brain bases,” *Cogn Affect Behav Neurosci*, vol. 16, no. 1, pp. 3–22, Feb. 2016, doi: 10.3758/s13415-015-0370-7.
- [12] D. Juniati and I. K. Budayasa, “The Mathematics Anxiety: Do Prospective Math Teachers Also Experience It?,” *J. Phys.: Conf. Ser.*, vol. 1663, p. 012032, Oct. 2020, doi: 10.1088/1742-6596/1663/1/012032.
- [13] R. Jiang *et al.*, “How Mathematics Anxiety Affects Students’ Inflexible Perseverance In Mathematics Problem-Solving: Examining The Mediating Role Of Cognitive Reflection,” *British Journal of Educational Psychology*, vol. 91, Jun. 2020, doi: 10.1111/bjep.12364.
- [14] C. Malone and A. Wachholtz, “The Relationship of Anxiety and Depression to Subjective Well-Being in a Mainland Chinese Sample,” *J Relig Health*, vol. 57, no. 1, pp. 266–278, Feb. 2018, doi: 10.1007/s10943-017-0447-4.
- [15] S. I. Hasanah, “Sumber Belajar Matematika Dari Lingkungan Alam Sekitar Berbasis Pondok Pesantren,” *INTERAKSI: Jurnal Kependidikan*, vol. 9, no. 1, Art. no. 1, Jan. 2014, Accessed: Jun. 29, 2021. [Online]. Available: http://ejournal.unira.ac.id/index.php/jurnal_interaksi/article/view/518
- [16] C. Choirudin, E. F. Ningsih, M. S. Anwar, A. Choirunnisa, and A. Maselena, “The Development of Mathematical Students Worksheet Based on Islamic Values Using Contextual Approach,” *International Journal on Emerging Mathematics Education*, vol. 3, no. 2, Art. no. 2, Apr. 2020, doi: 10.12928/ijeme.v3i2.13286.
- [17] Choirudin, M. S. Anwar, I. N. Azizah, Wawan, and A. Wahyudi, “Pengembangan LKPD Matematika Berbasis Kaligrafi dengan Pendekatan Guided Discovery Learning,” *Jurnal Pendidikan Matematika (JPM)*, vol. 7, no. 1, Art. no. 1, Jan. 2021, doi: 10.33474/jpm.v7i1.6738.
- [18] P. Liljedahl, M. Santos-Trigo, U. Malaspina, and R. Bruder, “Problem Solving in Mathematics Education,” in *Problem Solving in Mathematics Education*, P. Liljedahl, M. Santos-Trigo, U. Malaspina, and R. Bruder, Eds. Cham: Springer International Publishing, 2016, pp. 1–39. doi: 10.1007/978-3-319-40730-2_1.
- [19] Syaifuddin, A. H. Fathani, and Surahmat, “Teacher Actions Bring up Students’ Thoughts in Solving Mathematical Problems,” *ujer*, vol. 7, no. 12, pp. 2784–2788, Dec. 2019, doi: 10.13189/ujer.2019.071228.
- [20] S. D. Handayani, “Pengaruh Kecemasan Matematika terhadap Pemahaman Konsep Matematika,” *SAP (Susunan Artikel Pendidikan)*, vol. 4, no. 1, Art. no. 1, Aug. 2019, doi: 10.30998/sap.v4i1.3708.