



Integration of Islamic Religious Education Learning in Mathematics as an Effort to Strengthen Student Character Education

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Abstract

Keywords:
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Islamic
Religious
Education;
Mathematic;
Character
education.

Character education in Indonesia can be done through “*meaning of learning*”. It is by integrating the learning of Islamic Religious Education and Mathematics. This integration will expand Mathematics, so that it is not only a learning with symbols, but also a meaningful learning. The research method used quantitative of experimental design to determine the effect of treatment integration of Islamic religious education learning with mathematics. Thus, this study divided the object of research into two groups, namely experimental and control. Data analysis in this study used independent sample t-test. The results showed that there was a significant difference between the mean of the experimental and control groups, the experimental mean had a higher mean value. While the results of the independent sample t-test test showed a significance value of $0,009 < 0,05$ so that H_0 was rejected and H_1 was accepted. The integration of Islamic religious education learning in mathematics has proven to be influential as an effort to strengthen student character education. The findings of this study also offer an interdisciplinary integration paradigm, which will be discussed further.

Abstrak:

Kata Kunci:
Integrasi;
Pendidikan
Agama
Islam;
Matematika;
Pendidikan
Karakter

Pendidikan karakter di Indonesia dapat dilakukan melalui “pemaknaan dalam pembelajaran”. Pemaknaan tersebut dengan cara mengintegrasikan pembelajaran Pendidikan Agama Islam dan Matematika. Integrasi ini akan memperluas Matematika sehingga tidak hanya menjadi pembelajaran dengan simbol-simbol saja, melainkan pembelajaran yang penuh makna. Metode penelitian menggunakan kuantitatif yang bersifat eksperimen untuk mengetahui pengaruh treatment integrasi pembelajaran Pendidikan Agama Islam dengan matematika. Dengan demikian, penelitian ini membagi objek penelitian ke dalam dua kelompok, yaitu eksperimen dan kontrol. Analisis data dalam penelitian ini menggunakan uji independent sampel t-test. Hasil

penelitian menunjukkan bahwa terdapat perbedaan signifikan antara mean kelompok eksperimen dan kontrol, mean eksperimen memiliki nilai mean yang lebih tinggi. Sedangkan hasil uji independent sampel *t*-tes menunjukkan nilai signifikansi sebesar $0,009 < 0,05$ sehingga H_0 ditolak dan H_1 diterima. Integrasi pembelajaran pendidikan agama Islam dalam matematika terbukti berpengaruh sebagai upaya penguatan pendidikan karakter siswa. Penelitian ini juga menawarkan paradigma integrasi interdisipliner, yang akan dibahas lebih lanjut dalam diskusi penelitian.

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1. Introduction

Based on the law No. 20 of 2003 concerning the National Education System Article 3 states that national education must have a function to shape the character and civilization of a dignified nation. The consequence of this law is that every educational institution must carry out character education to give birth to a generation of noble character, independent, knowledgeable, creative, capable and responsible. But in fact, character education in Indonesia is still less than optimal and there are even some cases showing that Indonesia is experiencing continuous decadence.

Various cases have emerged among students as an indication of decadence in Indonesia, for example, student fights,¹ narcotics abuse,² free sex,³ leaking exam questions,⁴ plagiarism,⁵ and so on. In addition, the Child Protection Commission also stated that cases of pornography, physical violence, child sexual crimes continued to increase during the 2011-2016.⁶ These facts empirically indicate that Indonesia is facing a very concerning problem of character education. Furthermore, this problem indirectly gives a signal that the mandate of character education in Law no. 20 of 2003 has not been implemented properly.

Basically, character education can be started from elementary school. This is in accordance with the opinion of Sidi that basic education has the main goal of helping students to develop the intellectual and mental side, forming the character of student independence, helping students grow as social beings and increasing their creativity.⁷ The inculcation of attitude competence can also be

¹ Reza Agustian, "Bawa Senjata Tajam Hendak Tawuran di Kemayoran, 9 Pelajar Ditangkap Polisi," *KOMPAS.com*, June 1, 2022, sec. Megapolitan, <https://megapolitan.kompas.com/read/2022/06/01/11045001/bawa-senjata-tajam-hendak-tawuran-di-kemayoran-9-pelajar-ditangkap-polisi>.

² Idon Tanjung, "14 Pelajar Dan 5 Mahasiswa Di Riau Ditangkap Saat Operasi Narkotika," *KOMPAS.Com*, 2021, sec. Regional.

³ Indira Rezkisari, "Remaja Diperkosa 10 Orang, KemenPPPA Ingatkan Pentingnya Edukasi Pergaulan," *REPUBLIKA.Co.Id*, 2022, sec. Nasional.

⁴ Nur Rohmi Aida, "Ramai Dugaan Soal UTBK-SBMPTN Bocor, Berikut Tanggapan LTMP," *KOMPAS.Com*, 2022, sec. Tren.

⁵ Nurman Abdul Rahman, "Isu Plagiasi Ramaikan Pemilihan Rektor Baru ISBI," *Aktual.Com*, 2022, sec. Regional.

⁶ Komisi Perlindungan Anak Indonesia, "Bank Data Perlindungan Anak," 2018, <https://bankdata.kpai.go.id/>.

⁷ Indra Djati Sidi, *Menuju Masyarakat Belajar: Menggagas Paradigma Baru Pendidikan*

instilled effectively since this basic education. Fadjar even stated that a child can grow his personality in a positive direction in this basic education.⁸ Ruby & Doolittle reported that basic education is able to effectively foster students to have positive behavior, reduce negative behavior, and ultimately improve academic performance.⁹ Pearson & Nicholson wrote about comprehensive character education which ideally can be applied in basic education.¹⁰ Even Milson & Mehlig revealed in their research that basic education teachers have positive perceptions of character education aspects.¹¹

Related with this basic education, Indonesia is actually in a favorable condition. The number of formal basic education dominates more than schools at the level above. The Central Statistics Agency released the number of schools in 2019/2020 with details for elementary school level 149,435, 40,559 for junior high school, 13,939 for high school, and 14,301 for vocational school.¹² Based on these data, the quality of character education in Indonesia should be guaranteed. But what happens is that character education still looks less effective as the facts of the moral degradation case above. Therefore, the solution of thought becomes a necessity to overcome the problem of the decline in character education that currently happen.

One thing that deserves to be proposed as a solution related to this problem is Islamic Religious Education. There is a lot of evidence that states that PAI has a major contribution in efforts to build the nation's character by utilizing various strategies and methods. Anwar & Salim states that Islamic religious education has a large enough influence to support the formation of the nation's character with various strategies, approaches and methods that are quite deep and basic.¹³ Zulaikah mentions that Islamic religious education is closely related to character education so that it can have the potential to improve the character of students.¹⁴ Likewise, Delvi & Rochmat explained about MAN 3 Palembang which applied the dormitory method to instill student character through the main values of leadership, independence and religion.¹⁵ Amalia explained that

(Jakarta Selatan: Paramadina, 2003).

⁸ Malik Fadjar, *Madrasah Dan Tantangan Modernitas* (Bandung: Mizan, 1998).

⁹ Allen Ruby and Emily Doolittle, *Efficacy of Schoolwide Programs to Promote Social and Character Development and Reduce Problem Behavior in Elementary School Children. Report from the Social and Character Development Research Program. NCER 2011-2001, National Center for Education Research* (National Center for Education Research, 2010), <https://eric.ed.gov/?id=ED512329>.

¹⁰ Quinn M. Pearson and Janice I. Nicholson, "Comprehensive Character Education in the Elementary School: Strategies for Administrators, Teachers, and Counselors," *The Journal of Humanistic Counseling, Education and Development* 38, no. 4 (June 2000): 243–51, <https://doi.org/10.1002/j.2164-490X.2000.tb00085.x>.

¹¹ Andrew J. Milson and Lisa M. Mehlig, "Elementary School Teachers' Sense of Efficacy for Character Education," *The Journal of Educational Research* 96, no. 1 (September 2002): 47–53, <https://doi.org/10.1080/00220670209598790>.

¹² Badan Pusat Statistika, *Potret Pendidikan Statistik Pendidikan Indonesia 2019* (Jakarta: Badan Pusat Statistika, 2020).

¹³ Syaiful Anwar and Agus Salim, "Pendidikan Islam Dalam Membangun Karakter Bangsa Pendahuluan," *Al-Tadzkiyyah: Jurnal Pendidikan Islam* 9, no. 2 (2018): 233–47.

¹⁴ Siti Zulaikhah, "Penguatan Pendidikan Karakter Melalui Pendidikan Agama Islam Di Smpn 3 Bandar Lampung," *Al-Tadzkiyyah: Jurnal Pendidikan Islam* 10, no. 1 (2019): 83–93, <https://doi.org/10.24042/atjpi.v10i1.3558>.

¹⁵ Revki Rama Delvi and Saefur Rochmat, "Character Education at MAN 3 Palembang Boarding School" (International Conference on Social Science and Character Educations (ICoSSCE 2018) and International Conference on Social Studies, Moral,

character education can be successfully implanted through the integration of literacy and character education itself in a unified scope of Islamic religious education.¹⁶ From some of these studies, it is clear that learning Islamic religious education has the potential to improve the character of the nation.

On the other hand, it does not mean that Islamic religious education is perfect and cannot be separated from the problems. In practice, generally, Islamic religious education learning tends to be monotonous and rigid.¹⁷ In addition, the problems related to globalization and technological developments continue to increase,¹⁸ which thus requires Islamic religious education to always be adaptive and evolving.¹⁹ This of course must be done immediately to improve the quality of education and develop Islamic religious education learning itself. The goal is to harmonize Islamic religious education with the development of science and technology today. One of the efforts that can be made to improve the learning of Islamic religious education is to integrate it with other general sciences.²⁰

Various sciences that are integrated with religious values and human values will make human life better and nobler. Various clear boundaries in Islam, of course, will keep humans safe from various threats of dehumanization. However, the substance of the integration between religious knowledge and other sciences is still not realized by the community. Many think that the two are

and Character Education (ICSMC 2018), Atlantis Press, 2019), 298–303, <https://www.atlantis-press.com/proceedings/icossce-icsmc-18/125910016>.

¹⁶ Husna Amalia, "The Integration of Literacy and Character Building in Islamic Education," in *Proceedings of the 6th International Conference on Community Development (ICCD 2019)* (Proceedings of the 6th International Conference on Community Development (ICCD 2019), Bandar Seri Begawan, Indonesia: Atlantis Press, 2019), <https://doi.org/10.2991/iccd-19.2019.63>.

¹⁷ Akhsanul Fuadi and Suyatno Suyatno, "Integration of Nationalistic and Religious Values in Islamic Education: Study in Integrated Islamic School," *Randwick International of Social Science Journal* 1, no. 3 (October 23, 2020): 555–70, <https://doi.org/10.47175/rissj.v1i3.108>.

¹⁸ Abdul Muqaddas Opeyemi Ishaq El-Mubarak and Isyaku Hassan, "Challenges of Islamic Education in the Era of Globalization: A Proposed Holistic Solution," SSRN Scholarly Paper (Rochester, NY, August 29, 2021), <https://papers.ssrn.com/abstract=3917906>; Nurdyansyah Nurdyansyah and Moch. Bahak Udin By Arifin, "Integration of Islamic Values in Elementary School," in *Proceedings of the 1st International Conference on Intellectuals' Global Responsibility (ICIGR 2017)* (1st International Conference on Intellectuals' Global Responsibility (ICIGR 2017), Sidoarjo, Indonesia: Atlantis Press, 2018), <https://doi.org/10.2991/icigr-17.2018.46>.

¹⁹ Sa'dullah Assa'idi, "Religious Education Curriculum in Indonesian Islamic University in the Digital Age: Incepting Thematic Alquran of Fadlur Rahman," *Journal of Social Studies Education Research* 12, no. 3 (2021): 294–311.

²⁰ M. Amin Abdullah, "Religion, Science, and Culture: An Integrated, Interconnected Paradigm of Science," *Al-Jami'ah: Journal of Islamic Studies* 52, no. 1 (April 8, 2015): 175–203, <https://doi.org/10.14421/ajis.2014.52.1.175-203>; Sean Esbjörn-Hargens and Ken Wilber, *Toward A Comprehensive Integration Of Science and Religion: A Post-metaphysical Approach* (Oxford University Press, 2008), <https://doi.org/10.1093/oxfordhb/9780199543656.003.0032>; Nidhal Guessoum, "Islam and Science: The Next Phase of Debates," *Zygon* 50, no. 4 (2015): 854–76, <https://doi.org/10.1111/zygo.12213>; Muhammad Nasir, Yatin Mulyono, and Luvia Rangi Nastiti, "Reconstructing Distinction Pattern of Science Education Curriculum in Indonesian Islamic Universities: An Integrated Paradigm for Science and Religion," *Journal of Turkish Science Education* 17, no. 1 (March 2020): 11–21.

different things. Both have different areas of discussion and are not related to each other.²¹ This is of course a wrong perception, Faizin states that religious knowledge and other general sciences are actually synergistic with each other and will provide great benefits for the development of contemporary Islamic civilization.²² Not only in a concept, but also in the implementation of Islamic religious education learning.

Several studies related to the integration of Islamic religious education learning with other scientific fields have actually been carried out. Siregar et al stated that the integration of Islamic religious education materials with rational sciences in schools can have a positive impact on student activity during learning, students can provide good ideas and analyze material that is integrated and interconnected with everyday life.²³ Similarly, Adawiyah states that the integration of science and religion will produce transcendent knowledge.²⁴ Hidayat et al suggest in their research that the existence of Islamic educational institutions is more effective in carrying out the transformation of Islamic values into science and technology.²⁵ Nasrudin et al initiated a new design to integrate character education, Islamic values, and local wisdom in a single unit of science learning which was then called the polyculture strategy.²⁶ Hidayat et al tried to integrate the values of Islamic religious education into sociology learning.²⁷

Based on some studies above, it is clear that the integration of Islamic Religious Education learning with other general sciences will result in better learning and student output. In addition, there has not been a specific study on the integration of Islamic religious education learning with mathematics as an effort to improve the character education of students. Thus, this study will conduct further analysis regarding student character education in the integration of Islamic religious education learning with mathematics, then compare it with student character education without integration. An analysis of the implementation of the integrated learning model of Islamic religious education

²¹ Muhammad Amin Abdullah, *Menyatukan Kembali Ilmu-Ilmu Agama Dan Umum* (Yogyakarta: Suka Press IAIN Sunan Kalijaga, 2003).

²² Faizin, "Integrasi Agama Dan Sains Dalam Tafsir Ilmi Kementerian Agama RI," *Jurnal Ushuluddin* 25, no. 1 (2017): 19, <https://doi.org/10.24014/jush.v25i1.2560>.

²³ Maragustam Siregar, Dwi Noviatul Zahra, and Dian Andesta Bujuri, "Integrasi Materi Pendidikan Agama Islam Dalam Ilmu-Ilmu Rasional Di Sekolah Menengah Atas Islam Terpadu," *Al-Tadzkiyyah: Jurnal Pendidikan Islam* 10, no. 2 (2019): 183–201, <https://doi.org/10.24042/atjpi.v10i2.4847>.

²⁴ Rabiatul Adawiah, "Integrasi Sains Dan Agama Dalam Pembelajaran Kurikulum PAI (Perspektif Islam Dan Barat Serta Implementasinya)," *Al-Banjari* 15, no. 1 (2016): 99–124.

²⁵ Moch. Charis Hidayat et al., "Integration Science Technology with Islamic Values: Empowering Education Model," in *Proceedings of the 1st Borobudur International Symposium on Humanities, Economics and Social Sciences (BIS-HESS 2019)* (1st Borobudur International Symposium on Humanities, Economics and Social Sciences (BIS-HESS 2019), Magelang, Indonesia: Atlantis Press, 2020), <https://doi.org/10.2991/assehr.k.200529.202>.

²⁶ Dindin Nasrudin et al., "Polyculture Strategy: Integration of Islamic Values, National Character, and Local Wisdom in Science Learning," in *Proceedings of the International Conference on Islamic Education (ICIE 2018)* (International Conference on Islamic Education (ICIE 2018), Bandung, Indonesia: Atlantis Press, 2018), <https://doi.org/10.2991/icie-18.2018.43>.

²⁷ Tatang Hidayat et al., "Designing Islamic Values Integration into Sociology Learning," *Jurnal Pendidikan Islam* 6, no. 1 (June 30, 2020): 37–56, <https://doi.org/10.15575/jpi.v6i1.8119>.

with mathematics to strengthen students' character education was also carried out in this study, then the results were compared with conventional learning models.

2. Methods

This research included all Surabaya elementary school students. while the sample technique includes cluster random selection, with 50 students picked from elementary schools in Surabaya's South, North, West, East, and Central districts to represent all primary school students in the city. The following table contains detailed information on the research sample:

Table 1. Details of the research sample ($n = 50$)

No	Location	Name of School	Percentage
1	South Surabaya	SD Negeri Menggal 601	25%
2	North Surabaya	SD Negeri Krembangan UTARA I56	20%
3	West Surabaya	SD Negeri Asemrowo	20%
4	East Surabaya	SD Negeri Gubeng I/204	15%
5	Central Surabaya	SD Negeri Alon-Alon Contong I/87	20%
Total			100%

The method of this study is quantitative experiment to determine the effect of the integration treatment of Islamic Religious Education learning in mathematics as an effort to strengthen student character education. Thus, the research object was divided into two groups, namely the experimental group and the control group. The experimental group was given a treatment (X), which was to integrate Islamic Religious Education learning in mathematics. While the control group was not given the treatment. The data analysis technique in this study is the independent sample t test. The results of the analytical study from this study were formulated into a more effective character education strategy in elementary schools.

3. Result and Discussion

3.1 Integration of Islamic Religious Education Learning in Mathematics

The interdisciplinary integration model is applied in the integration model of this study. This integration strategy is built on a collaborative relationship between two types of scientific disciplines, each with its own methodology.²⁸ Furthermore, the instructions for the interdisciplinary integration model in this study are based on the findings of Klaassen's research,²⁹ and the discipline adjustment process is carried out in the next stage. As a result, this study connects two disparate fields: Islamic religious studies and mathematics. The following illustrated figure shows how Klaassen's results were used to adapt the interdisciplinary integration model in this study.

²⁸ Kementerian Agama RI, *Pedoman Implementasi Integrasi Ilmu Di Perguruan Tinggi Keagamaan Islam (PTKI)* (Jakarta: Direktorat Jenderal Pendidikan Islam, 2019).

²⁹ Renate G. Klaassen, "Interdisciplinary Education: A Case Study," *European Journal of Engineering Education* 43, no. 6 (November 2, 2018): 842–59, <https://doi.org/10.1080/03043797.2018.1442417>.

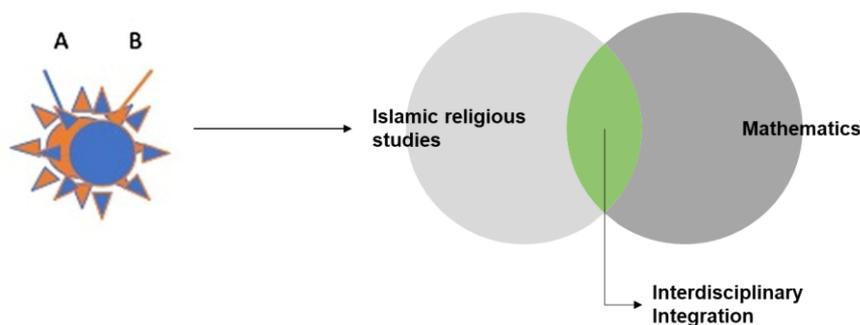


Figure 1. The Interdisciplinary Integration Model

For this study, the interdisciplinary integration strategy was adopted for a number of reasons. Collaboration across disciplines is a natural phenomenon.³⁰ A discipline's learning activities are constrained by unique restrictions, and broadening the scope of these disciplines need explanations from other disciplines.³¹ Furthermore, each discipline interacts with others.³² This results in the establishment of a 'third space' in which views intersect, stimulating cooperative production.³³ In this study, two fields, Islamic religious studies and mathematics, collide to form a "third space". According to Akkerman & Bakker's study findings, third spaces may encourage critical thinking, aid in the development of new information, educate students to be open to diverse ideas, and much more.³⁴

The notion of interdisciplinary integration surely necessitates a plan for implementation. The stages of integration of Islamic Religious Education and mathematics are as follows.³⁵

1. Infusion strategy, in this case the teacher emphasizes aspects of mathematics material related to Islamic Religious Education material;
2. Analogy, in this case the teacher analogizes the values of goodness in teaching Islamic Religious Education which is integrated with mathematics;
3. Narrative, in this case the teacher tells about Muslim mathematicians so that lessons can be taken;

³⁰ Klaassen.

³¹ Orkhon Gantogtokh and Kathleen M. Quinlan, "Challenges of Designing Interdisciplinary Postgraduate Curricula: Case Studies of Interdisciplinary Master's Programmes at a Research-Intensive UK University," *Teaching in Higher Education*, February 28, 2017, <https://www.tandfonline.com/doi/abs/10.1080/13562517.2016.1273211>.

³² Carla Gonçalves Machado, Mats Peter Winroth, and Elias Hans Dener Ribeiro da Silva, "Sustainable Manufacturing in Industry 4.0: An Emerging Research Agenda," *International Journal of Production Research* 58, no. 5 (March 3, 2020): 1462–84, <https://doi.org/10.1080/00207543.2019.1652777>.

³³ Janice F. Almasi, "Crossing Boundaries in Literacy Research: Challenges and Opportunities," *Literacy Research: Theory, Method, and Practice* 65, no. 1 (November 1, 2016): 24–46, <https://doi.org/10.1177/2381336916661542>.

³⁴ Sanne F. Akkerman and Arthur Bakker, "Boundary Crossing and Boundary Objects," *Review of Educational Research* 81, no. 2 (June 2011): 132–69, <https://doi.org/10.3102/0034654311404435>.

³⁵ Mutijah, "Model Integrasi Matematika Dengan Nilai-Nilai Islam Dan Kearifan Lokal Budaya Dalam Pembelajaran Matematika," *Jurnal Pendidikan Matematika (Kudus)* 1, no. 2 (2019), <https://doi.org/10.21043/jpm.v1i2.4878>.

4. *Uswah Hasanah*, in this case the teacher shows behaviors as values in learning Islamic Religious Education and relates it to mathematics.

The four stages above are very important stages. Infusion, for example, can effectively increase students' attention in the learning process;³⁶ Velepini conducted an infusion to integrate the learning environment with curriculum content;³⁷ even Johnson & Atwater revealed that infusion needs to be done in the pedagogical aspect to integrate cultural elements with science material in learning.³⁸ In the context of this research, infusion becomes very important to integrate mathematics material with Islamic religious education material with the aim of enriching the two disciplines as well as providing a reference for new approaches. This is not impossible, because there are some mathematical materials that intersect with Islamic religious education, and vice versa.

In Islamic studies itself, the analogy commonly referred to as *qiyas* is one of the important approaches to constructing knowledge.³⁹ In fact, *qiyas* is the most dominant method among other such as *ijma'* and others. *Qiyas* demonstrates a syllogistic procedure consisting of induction from the known to discovering the unknown. Furthermore, Arjmand adds that analogy (*qiyas*) allows one to find a relationship between one another.⁴⁰ This is certainly very suitable with the research context, namely finding the relationship between Islamic religious education material and mathematics material.

The integration of Islamic Religious Education learning in mathematics is carried out by taking several materials from Islamic Religious Education, including material on honesty. In this case the teacher invites students to understand the concept of honesty from the concept of multiplication in mathematics.

In starting learning activities, the teacher gives an apperception that Allah SWT commands us to always be honest. As stated in Q.S At-Taubah verse 119, Az-Zumar verse 33, Al-Maidah verse 8, An-Nahl verse 105 and Al-Ankabut Verse 3. Furthermore, the teacher shows that everything in this universe runs according to the laws that have been set by Allah. Likewise, the concept in mathematics itself is binding if it requires precise and appropriate results. If the rules in mathematics are not used correctly, of course it will reach a wrong conclusion.

The concept of honesty as described in the Qur'anic verse is the same as the concept of multiplication in mathematics.

³⁶ Karen I. Fredriksen-Goldsen, Robin P. Bonifas, and Nancy R. Hooyman, "Multigenerational Practice: An Innovative Infusion Approach," *Journal of Social Work Education* 42, no. 1 (January 2006): 25–36, <https://doi.org/10.5175/JSWE.2006.200400420>.

³⁷ Kgosietsile Velepini, "Infusion or Confusion: A Meta-Analysis of Environmental Education in the 21st Century Curriculum of Botswana," *Africa Education Review* 14, no. 1 (January 2, 2017): 42–57, <https://doi.org/10.1080/18146627.2016.1224560>.

³⁸ Natasha Hillsman Johnson and Mary M. Atwater, "The Impact of Beliefs and Actions on the Infusion of Culturally Relevant Pedagogy in Science Teacher Education," in *Multicultural Science Education*, ed. Mary M. Atwater, Melody Russell, and Malcolm B. Butler (Dordrecht: Springer Netherlands, 2014), 81–102, https://doi.org/10.1007/978-94-007-7651-7_6.

³⁹ Reza Arjmand, "Introduction to Part I: Islamic Education: Historical Perspective, Origin, and Foundation," in *Handbook of Islamic Education*, ed. Holger Daun and Reza Arjmand, vol. 7, International Handbooks of Religion and Education (Cham: Springer International Publishing, 2018), 3–31, https://doi.org/10.1007/978-3-319-64683-1_3.

⁴⁰ Arjmand.

- a) When a positive number is multiplied by a positive number, the result is a positive number ($+ \times + = +$). Similar to the concept of honesty, if something true is said to be true, then someone who says it will enter the right group of people.
- b) When a positive number is multiplied by a negative number, the result is a negative number ($+ \times - = -$). It is the same with the concept of honesty, if something right is said to be wrong, then someone who says it will enter the wrong group of people.
- c) When a negative number is multiplied by a positive number, the result is a negative number ($- \times + = -$). Similarly, the concept of honesty, if something wrong is said to be true, then someone who says it will enter the wrong group of people.
- d) When a negative number is multiplied by a negative number, the result is a positive number ($- \times - = +$). Similarly, the concept of honesty, if something is wrong is said to be wrong, then the person who says it will enter the right group of people.

The learning activity ended by giving assignments to students to find material from Islamic Religious Education and integrate it with mathematics.

3.2 *Integration of Islamic Religious Education Learning in Mathematics as an Effort to Strengthen Student Character Education*

Character education has a very important role in various aspects of life. This is because character education has a function to shape a person into a better person.⁴¹ Muhammad et al stated that the application of character education is to solve increasing social problems such as corruption, juvenile delinquency, brawls between students, drug abuse, free sex, and others;⁴² even Berkowitz & Simmons stated that character itself is a combination of psychological characteristics that enable individuals to act as moral agents: moral behavior, moral values, moral personality, moral emotions, moral reasoning, moral identity, and basic characteristics.⁴³ More about Berkowitz & Simmons adds that character education, thus, will lead a person to understand, care, and act based on universal values such as respect, responsibility, or honesty.⁴⁴ Thus, character education is a comprehensive approach to promote moral functioning.

Likewise in learning, the application of character education in a lesson will certainly provide a different experience for students, because it can provide them with an understanding that makes it easier for them to actualize the meaning of the learning itself.⁴⁵ Integration in this study aims to lead students to

⁴¹ Aynur Pala, "The Need for Character Education," *International Journal of Social Sciences and Humanity Studies* 3, no. 2 (2011): 23–32.

⁴² Ar Muhammad et al., "Character Education, Student Mental Revolution, and Industry 4.0: The Case of State Islamic Senior High Schools in Indonesia," in *Proceedings of the International Conference on Progressive Education (ICOPE 2019)* (International Conference on Progressive Education (ICOPE 2019), Lampung, Indonesia: Atlantis Press, 2020), <https://doi.org/10.2991/assehr.k.200323.105>.

⁴³ Marvin W. Berkowitz and Patrica E. Simmons, "Integrating Science Education and Character Education," in *The Role of Moral Reasoning on Socioscientific Issues and Discourse in Science Education*, ed. Dana L. Zeidler (Dordrecht: Springer Netherlands, 2003), 117–38, https://doi.org/10.1007/1-4020-4996-X_7.

⁴⁴ Berkowitz and Simmons.

⁴⁵ Samsul Maarif, "Integrasi Matematika Dan Islam Dalam Pembelajaran Matematika," *INSANIA: Jurnal Pemikiran Alternatif Kependidikan* 4, no. 2 (2015): 273–83,

gain direct experience in the learning process and understand how a concept can be formed. Therefore, character education needs to be taught to students with the aim that students are not only proficient in mastering learning materials, but also become individuals with high character. In this study, the character values developed are communicative, conscientious, hard-working, creative, independent, curious and religious.

These characters are certainly based on the Quran as a portrayal of Islamic religious studies. Infusions such as improving communicative character may be employed in the integration strategy, with the foundation being Quran Surah Ash-Shaff verses 2-3, which indicates that any communication must be based on strong proof. As a result, the teacher emphasizes to students that any approach of solving math problems must be able to exhibit flow and evidence clarity. Thus, students may acquire accustomed to being communicatively appropriate and good; appropriate because it is consistent with the facts, and good because it is compatible with the Quran's teachings.

In setting where the Quran serves as a religious guide, other strategy, such as narrative, might be used to build religious personalities. The teacher can define a Muslim mathematician who is not only extremely knowledgeable and finds mathematical concepts, but also displays extraordinary Islamic values, such as abiding to the Quran on a constant basis. This enables to inspire students and strengthen their confidence in spiritual ideas.

Similarly, other characteristics such as caution (QS al-Baqarah verse 234), hard work (at-Taubah verse 105), creativity (QS. Al-Baqarah verse 219), independence (QS. An-Nahl Verse 12), and high curiosity (QS. An-Nahl Verse 12) can be integrated in learning mathematics through other strategies such as analogy or *uswah hasanah*. Table 2 below is the character values and their implementation indicators;

Table 2. Values and Indicators of the Character Education Implementation

No	Character Values	Role and Attitude
1	Communicative	1. I always listen to the teacher when explaining math lessons.
2	Careful	1. I realize that basically Islamic religious education materials talk about principles in mathematics. 2. I realize that mathematics can also help us in understanding Islamic religious education materials. 3. I realize that mathematics is very important and meaningful in all aspects of life.
3	Hard-working	1. I like the Islamic religious education learning model approach used by teachers, namely the integration of Islamic religious education with mathematics. 2. I am interested and excited when the teacher explains using the integration approach of Islamic religious education with mathematics. 3. I feel happy with the learning of Islamic religious

<https://doi.org/10.24090/insania.v19i2.716>.

		education which is integrated with mathematics. 4. I can integrate Islamic religious education materials with mathematics.
4	Creative	1. Learning using an integrated approach to Islamic religious education lessons with mathematics gave me new knowledge.
5	Independent	1. Islamic religious education learning activities using an integrated approach to mathematics can help me understand and practice religious values in everyday life.
6	Curiosity	1. I want to find other Islamic religious education materials related to mathematics.
7	Religious	1. Learning by using an integrated approach to Islamic religious education materials with mathematics makes me closer to Allah. 2. With a learning model that uses an Islamic religious education approach and mathematics, I can learn mathematics as well as learn the greatness of Allah.

3.3 Descriptive Statistics Test Result Data

This research is a quasi-experimental type of research with pretest and post-test methods to determine the effect of the integration of Islamic religious education learning in mathematics as an effort to strengthen student character education. This research was conducted in class VI SDN dated 601, namely class VI-A as control and class VI-B as experimental class. The description of the control class data can be seen in Table 3.

Table 3. Descriptive Control Class Data

Maximum	65
Minimum	31
Mean	53,16
Std. Deviation	9,954
Variance	99,073
Range	34

Based on table 3, it is known that the mean value is 53.16. The mean value is then taken to represent the average performance of a representative research group.⁴⁶ The average value is obtained by adding up all the scores and then dividing by the number of members in the group. The recapitulation of the score for each character value can be seen in Figure 1 as follows.

⁴⁶ Craig P. Spielman and Marek McGann, "How Mean Is the Mean?," *Quantitative Psychology and Measurement*, 2013, <https://doi.org/10.3389/fpsyg.2013.00451>.



Figure 2. Recapitulation of Scores for Each Control Class Character Value

Based on Figure 2, it can be seen that the control class character scores for religious, creative, communicative and conscientious characters are relatively high. In contrast to the character scores of curiosity, independence and hard work which are still relatively low. Thus, it is necessary to renew different learning to strengthen these characters.

Next, the research data will be analyzed for the experimental class. The description of the experimental class research data can be seen in Table 4.

Table 4. Descriptive Experimental Class Data

Maximum	70
Minimum	36
Mean	61,44
Std. Deviation	10,782
Variance	116,261
Range	34

The mean value for the experimental class is 61.44. In this case, it can be seen that there is a fairly high difference between the control class and the experimental class. The experimental class has a higher mean value. The recapitulation of the score for each character value can be seen in Figure 3 as follows.



Figure 3. Recapitulation of the Score of Each Character Value of the Experiment Class

The diagram shows that the experimental class for each character value has increased significantly when compared to the control class. Especially in the character of curiosity.

3.4 Research Result Data Analysis

The research data were then analyzed using the independent sample t-test. Before conducting this independent sample t-test, the first step is to analyze whether the research data obtained have met the requirements of the parametric test, namely the data must be homogeneous and normally distributed.⁴⁷ Homogeneity test was carried out to determine whether the control group and experimental data were homogeneous or not.⁴⁸ The results of the homogeneity test of research data can be seen in Table 5 as follows.

Table 5. Results of Data Homogeneity Test

		Levene statistic	df1	df2	Sig.
Nilai	Based on Mean	0.002	1	47	0.969
	Based on Median	0.093	1	47	0.761
	Based on Median and with adjusted df	0.093	1	44.175	0.761
	Based on trimmed Mean	0.053	1	47	0.819

Based on Table 5, it is known that the respective significance values are more than 0.05. So it can be concluded that the data variance for the control and experimental classes is homogeneous. After the data homogeneity parametric conditions are met, then the normal distribution test will then be carried out. Testing the normal distribution in this case uses the Shapiro Wilk test. Test on the

⁴⁷ Peter Samuels, *Independent Samples T-Test* (England: Birmingham City University, 2015).

⁴⁸ Jean Pauwels, Andrée Lamberty, and Heinz Schimmel, "Homogeneity Testing of Reference Materials," *Accreditation and Quality Assurance* 3, no. 2 (1998): 51–55, <https://doi.org/10.1007/s007690050186>.

grounds that the research data used is less than or equal to 50.⁴⁹ The results of the data normality test can be seen in Table 6.

Table 6. Data Normality Test Results

Class	Shapiro-Wilk		
	Statistic	df	Sig.
Experiment	.786	18	0.143
Control	.921	31	0.204

Based on Table 6, it is known that the significance value for the experimental class is $0,143 > 0,05$ and the control class is $0,204 > 0,05$ so it can be concluded that the data is normally distributed.

Table 7. Test Results of Independent Sample t-test

t-test for Equality of Means						
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
2.724	47	0.009	8.283	3.041	2.166	14.400

Table 7 shows that the results of the independent sample t-test have a significance value of $0,009 < 0,05$ so that H_0 is rejected and H_1 is accepted. Thus, the conclusion is that the integration of Islamic religious education learning in mathematics has proven to be influential as an effort to strengthen student character education.

3.5 Discussion

Several studies have revealed that learning mathematics itself already contains elements of character education in it.⁵⁰ Even Warnick & Stenhagen stated that mathematics is not morally neutral.⁵¹ That is, mathematics can take sides to strengthen certain aspects that are the scope of morality on the condition that it involves modeling simulated reality. In the context of this research, the simulation reality modeling is in the form of Islamic Religious Education, which in the next stage is the cause of the 'religious' character values in this study. In other words, Islamic Religious Education as a simulated reality provides a place called 'religious' in learning mathematics to improve students' character.

⁴⁹ Prabhaker Mishra et al., "Descriptive Statistics and Normality Tests for Statistical Data," *Annals of Cardiac Anaesthesia* 22, no. 1 (2019): 67–72, https://doi.org/10.4103/aca.ACA_157_18.

⁵⁰ Azmil Hasan Lubis and Muhammad Nur Wangid, "The Analysis of Students' Discipline Character in Mathematics Learning," in *Proceedings of the 3rd International Conference on Current Issues in Education (ICCIE 2018)* (Proceedings of the 3rd International Conference on Current Issues in Education (ICCIE 2018), Yogyakarta, Indonesia: Atlantis Press, 2019), <https://doi.org/10.2991/iccie-18.2019.21>; Hardi Suyitno et al., "Integration of Character Values in Teaching-Learning Process of Mathematics at Elementary School of Japan," *International Journal of Instruction* 12, no. 3 (July 2019): 781–94.

⁵¹ Bryan R. Warnick and Kurt Stenhagen, "Mathematics Teachers as Moral Educators: The Implications of Conceiving of Mathematics as a Technology," *Journal of Curriculum Studies* 39, no. 3 (June 2007): 303–16, <https://doi.org/10.1080/00220270600977683>.

In addition, the reality in Islamic Religious Education is so broad. For example, Islamic Religious Education material presents historical realities that are so rich in Islamic figures who also played a role in the development of pure mathematics such as geometry, astronomy, arithmetic, algebra, and others.⁵² The reality of this Islamic Religious Education material can be a stimulus to bring up character responses from students such as curiosity, hard work, or being religious. Thus, this integrated learning model can effectively provide multiple perspectives at the same time. On the one hand, presenting pure mathematics material, and on the other hand getting character education through the reality of Islamic Religious Education that is presented.

Character education is not enough to be a subject or teaching material in schools. Because output character education is not just about knowledge, but a combination of cognitive, affective, and behavior as a whole.⁵³ This is what makes the integration learning model is very suitable for character education. The integration model can help students through the interpersonal process to understand the prevention of negative things and develop positive things rationally;⁵⁴ help students independently to improve and use their knowledge, learn and internalize and personalize character values into daily behavior.⁵⁵ Furthermore, character education will be very effective if it is accompanied by the attitude and example of the teacher so that this will be an important point to attract students' interest in learning and can foster active student participation.⁵⁶ This is very much in line with one of the learning steps in this study, namely *uswah hasanah* (good example).

The integration model of Islamic Religious Education learning with mathematics is an integration model that is proven to be effective and feasible to be developed further. The most important thing from learning this integration model is the certainty that students get meaningful learning, students can effectively capture the meaning of the theory they get in learning.⁵⁷ The integration model of Islamic Religious Education learning with mathematics has ensured this meaningful point, namely by showing that there is a wedge of principles in mathematics learning that is in accordance with Islamic Religious Education. The slices are character values. That is, if this integration model is

⁵² Glen Van Brummelen, "A Survey of Research in the Mathematical Sciences in Medieval Islam from 1996 to 2011," in *From Alexandria, Through Baghdad*, ed. Nathan Sidoli and Glen Van Brummelen (Berlin, Heidelberg: Springer Berlin Heidelberg, 2014), 101–38, https://doi.org/10.1007/978-3-642-36736-6_6.

⁵³ Berkowitz and Simmons, "Integrating Science Education and Character Education."

⁵⁴ Agustan Syamsuddin et al., "Mathematics Learning Interest of Students Based on the Difference in the Implementation of Model of Thematic Learning and Character-Integrated Thematic Learning," *European Journal of Educational Research* 10, no. 2 (April 15, 2021): 581–91, <https://doi.org/10.12973/eu-jer.10.2.581>.

⁵⁵ Thomas Lickona, "Eleven Principles of Effective Character Education," *Journal of Moral Education* 25, no. 1 (March 1996): 93–100, <https://doi.org/10.1080/0305724960250110>.

⁵⁶ Heni Kurniasih, Valentina Y.D. Utari, and Akhmadi, "Character Education Policy and Its Implications for Learning in Indonesia's Education System" (Research on Improving Systems of Education (RISE), November 14, 2018), https://doi.org/10.35489/BSG-RISE-RI_2018/007.

⁵⁷ Rahmatul Hayati et al., "The Effect of Applying Holistic Mathematics Education (HME) Model Based on 'Among System' Toward Character Values of Low-Grades Students," in *Proceedings of the 2nd International Conference on Mathematics and Mathematics Education 2018 (ICM2E 2018)* (Proceedings of the 2nd International Conference on Mathematics and Mathematics Education 2018 (ICM2E 2018), Padang, Indonesia: Atlantis Press, 2018), <https://doi.org/10.2991/icm2e-18.2018.22>.

applied by the teacher simultaneously, the character development of students will follow suit. The more successful the teacher can integrate Islamic Religious Education with mathematics so that the intersection of the two is clearer, then the character development of students will automatically follow. However, matters relating to technical integration steps still require further research. It is very necessary to find a formula for the integration of Islamic Religious Education with mathematics that is appropriate and relevant for all conditions.

4. Conclusion

The integration of PAI learning in mathematics in the experimental class showed a higher mean value than the control class. The results of the independent sample t-test also showed a significance value of $0,009 < 0,05$ so that H_0 is rejected and H_1 is accepted. That is, the integration of Islamic Religious Education learning in mathematics has proven to be influential as an effort to strengthen student character education. Students' characters refer to religious characters, curiosity, independence, creativity, hard work, thoroughness, and communicativeness. In addition, the integration of Islamic religious education learning in mathematics emphasizes more on meaning. In other words, mathematics learning material is not only teaching material and stops at the theoretical level. Islamic religious education in this case strengthens it from a meaningful perspective and provides a usability perspective that students can implement in their daily lives.

This study recommends further research related to the practical steps of integrating PAI in mathematics in order to produce an integration formula that is appropriate and relevant in all conditions. Furthermore, this study varies from the interdisciplinary integration model. As a result, future study should look at various integration approaches to promote student character.

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