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# *APPLICATION OF SPATIAL ANALYSIS TO ELIMINATING RADICALISM IN MADRASAH SCHOOLS*

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***ABSTRACT***
*The attack on the twin towers of the World Trade Center (WTC) on September 11, 2011 in New York, United States caused madrasas to be considered Islamic schools that gave birth to a radical generation. Madrasas' efforts to improve this negative image by improving the quality of education, especially 10 years after the incident, have succeeded in making Madrasas the schools of choice for students in Indonesia. This study focuses on analyzing the rise of Madrasah Tsanawiyah in the city of Pekanbaru, especially on students' mastery of knowledge for the last 4 years (2016, 2017, 2018 and 2019) by means of spatial analysis. The progress of science in Madrasas can be seen from the mapping of the value of knowledge, especially in the downtown area which is complete with various facilities and activity centers in Pekanbaru. The performance of some madrasas is almost the same as SMA in terms of mastery of knowledge. This study leads to an important analysis that the Pekanbaru madrasa as a Muslim-majority city has succeeded in making madrasas the main choice of parents to equip their children with religious and scientific education, which indirectly proves that madrasas do not provide space for the formation of radical Islamic generations, on the contrary. Madrasas have succeeded in forming a generation of Muslims who have good religious and scientific knowledge.*
***Keywords:*** *Spatial Analysis, Madrasah, Radicalism, Radical Generation*

## 1. Introduction

Islamic religion-based schools in Indonesia are referred to as Madrasas, have a larger number of subjects than public schools, this is because these religious schools have religious subjects and general subjects. Madrasah first entered Indonesia in the 18th century brought by scientists from Cairo, with the aim of modernizing the curriculum by incorporating general science curricula in addition to religious sciences (Ali & Furqon, 2016). Madrasas in Indonesia were also used at the beginning of their establishment as an effort to provide general knowledge, especially science in addition to religious knowledge to the native population, which was known during the Dutch colonial era general sciences and science were dominated in Dutch schools (Rahim, 2004; Ahid, 2010), besides In addition, Madrasas also provide opportunities for the poor to gain knowledge in the fields of religion and science (Ali, et al., 2011). Madrasas as a form of official Islamic education institution (Ma'zumi & Jakaria, 2012; Hoel, 2016) have the characteristic of integrating religious and general knowledge, using a curriculum of 70% general subjects and 30% religious studies (Tan, 2014). The composition of this curriculum indirectly opens opportunities to relate general science concepts to everyday life related to Islamic religious teachings, and this makes learning more meaningful (Perwati, et al., 2018). The combination of religious knowledge and general science will give birth to a concept of scientific integration, namely phenomena or information in religious knowledge will be clarified through proof using scientific principles (Baba, et al., 2015). The integration of religious knowledge into science requires an effective approach, strategy and preparation in learning, so that the curriculum needs to be prepared by involving experts in the fields of religion and science (Lubis, 2015).

Indonesia, as a country with the largest Muslim population in the world, has more than 50,000 Islamic schools with various levels, namely elementary level or Madrasah Ibtidaiyah (MI),

middle level or Madrasah Tsanawiyah (MT) and upper level or Madrasah Aliyah (MA) (Mansour, 2015). Previously Madrasas were known as second-grade schools or schools that were far behind public schools, this perception did not only occur in Indonesia but also in Pakistan and Bangladesh Asadullah & Chaudhury, 2016). The attack on the twin towers of the World Trade Center (WTC) on September 11, 2011 in New York City, has caused a bad image for Madrasas, and Madrasas have even been used as interesting research objects for Indonesian and Other Country Researchers (Asadullah & Chaudhury, 2016). Researchers, especially western researchers, are interested in researching the curriculum of Madrasas and Islamic Boarding Schools because since the attack, Madrasas and Islamic boarding schools have been considered as educational institutions that instill radical ideology in the generation of Muslims (Asadullah & Chaudhury, 2016; Rao & Hossain, 2011; Lintner, 2003; Tan & Kasmuri, 2007; Lukens-Bull, 2010; Al-Hasani et al., 2017). Madrasas are also considered as educational institutions that have many limitations, including limited operational funds which result in a lack of availability of school facilities and a shortage of teaching staff (Andrabi, et al., 2005). Over time, especially in the last 10 years since the WTC incident, Madrasas have been able to turn things around, becoming schools that can compete with public schools. Madrasahs are able to be on par in the achievement of winning national olympics in general subjects.

## 2. Literature Review

Remedial counteraction techniques are a type of instructive control planned to recondition "biased" understudies under the guise of public safety. McGlynn & McDaid (2019) advise educators to exercise caution in their efforts to prevent extremism because of the strong normative and political connotations of these issues. It is especially important for educators to make an effort to strike a balance between preventing students from radicalization and violent extremism and ensuring that their efforts do not impair the agency and independence of young lives (Sjøen & Mattsson, 2020; Sjøen, & Jore, 2019). Evidence from secondary school students who participated in a curriculum project on terrorism, extremism, and radicalization is looked at by Jerome & Elwick (2019). They argue that students' critical capacity for engaging with radicalization can be enhanced through enhanced political literacy and media literacy through a curriculum response that addresses the acquisition of knowledge (Muazza, et al., 2018).

PVE-E (programs for the prevention of radicalization and violent extremism through education) have emerged as a feature of global educational policy and educational institutions at all stages, from preschool to university. On the off chance that schools might be viewed as places of refuge here for personality and perspective development and encounters of having a place, the particular topic of PVE-E is a likewise hazardous area (Benjamin, et al., 2021a; Benjamin, et al., 2021b). Not only due to PVE-E's emphasis on radicalization, but also due to perceptions that schools are utilized as a supplement to governmental counterterrorism policy. We argue that developing ethical, sustainable, contextualized, and pedagogical strategies to prevent conflict and promote peaceful coexistence necessitates an understanding of young people's perspectives on radicalization and violent extremism (Vallinkoski, et al., 2022; Ragazzi, 2018; Sjøen, & Jore, 2019). Senior high schools, which should be educating society, have experienced severe radicalization. In schools, radicalism is now present on a consistent basis for students (Purwasih, & Widianto, 2020). This review was directed to dissect the school flexibility framework and the radicalism invasion process among public senior secondary school understudies. Because of the schools' low resilience, the research revealed that they are susceptible to radical thinking (Prijanto, et al., 2019, June). The school community, particularly teachers, is still very unaware of the radicalism threat. Because of its lack of coordination, the school bureaucracy has become a gateway for radical groups. Teachers have varying religious perspectives and expressions, and they have very little influence over the activities that students engage in outside of the classroom (Kustati, et al., 2023).

The development of science in Madrasas is very interesting to study, especially when the values of science lessons in Madrasas can compete with the values of science in public schools (Thamrin, et al., 2019). Today's madrasas are the main choice for parents to entrust their children to get general knowledge and religious knowledge, parents believe that in this modern era it is very necessary to add religious knowledge to children in addition to general knowledge. In

general, Madrasas in Indonesia are seen as the right place to provide a balance of religious knowledge and general knowledge for the development of a child (Hamidah, 2005). The rapid growth of Madrasas in Muslim-majority countries such as Pakistan and Indonesia has succeeded in denying that Madrasas are second-class schools or that are not taken into account, Madrasas have even grown into educational institutions that deserve to be reckoned with in terms of the quality of general and religious subjects. The success of this Madrasah is also determined by the ability of Madrasah teachers in compiling subject matter that combines Islamic knowledge with general knowledge, general knowledge, especially science, is used to clarify religious knowledge (Hassan, 2010). Teachers who are unable to combine science and religion usually do not get a good place in the eyes of Madrasah students (Abdallah, et al., 2011). The combination in determining the teaching materials owned by the teacher resulting in a pleasant learning atmosphere can have a positive impact on student learning and development (Kudari, 2016). Madrasah teachers are well aware that they not only play a role in imparting knowledge, but also in integrating moral and spiritual values, building the personality and character of students by motivating and guiding students in their learning (Kasim & Yusoff, 2014). The emotions of Madrasah students can be well controlled, this is a result of the general knowledge that has been obtained combined with Islamic sciences (Riyadi, 2015).

The days passed by Madrasah students radiated enthusiasm and happiness in studying. The combination of general science and Islamic religious knowledge creates a special interest and admiration for students to continue to be active in learning so that they can have a positive impact on student learning outcomes (Rustam & Arifin, 2012). Madrasah students and teachers have a very good emotional relationship, there is mutual understanding between each other. Learning that is based on a combination of Islamic religious knowledge and scientific knowledge has a positive impact on sincerity, sincerity and a sense of mutual responsibility between teachers and students (Baba, et al., 2015). Madrasah students have cohesiveness in learning Mathematics, this cohesiveness has a positive impact in motivating students to study seriously. Research on combining Mathematics and Islamic Studies has provided a very creative nuance of collaboration between fellow students (Purwati, et al., 2018).

## 3. Research Methods

### Data and Research Locations

Pekanbaru is the capital city of Riau Province. Pekanbaru is an area with a tropical climate with a population of around 2 million people

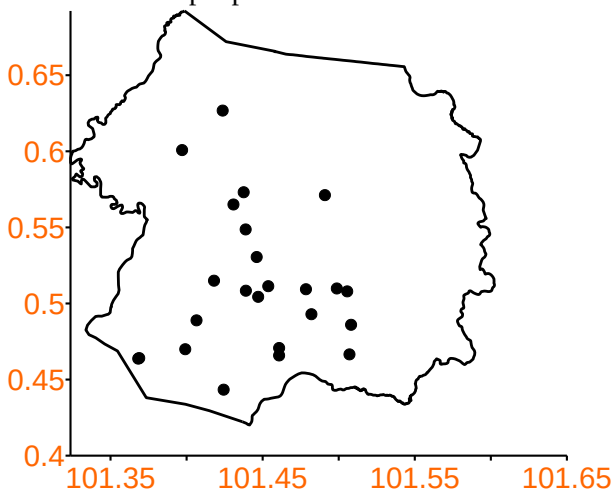


Fig. 1. Distribution of Madrasas throughout the city of Pekanbaru

The population is dominated by Muslims and workers in the private sector. Madrasah Tsanawiyah in Pekanbaru is often found in urban center areas with densely populated populations. The research was conducted by taking science subject scores for 4 consecutive years (2016, 2017, 2018 and 2019) throughout the city of Pekanbaru, Indonesia. The location of some Madrasas as a condition for spatial data in the form of latitude and longitude values as well as data on science values is given as in Table 1. The distribution of all Madrasahs in Pekanbaru is also given in

Figure 1, as a preliminary analysis to find out the uniformity of research locations in the Pekanbaru City area. Figure 1 shows that most Madrasahs are located in urban centers with densely populated populations.

Table 1 - Locations and Data on Science Lesson Values for some Madrasas in the city of Pekanbaru

| Madrasah Tsanawiyah | UN 2018-2019 | UN 2017-2018 | UN 2016-2017 | UN 2015-2016 | Latitude | Longitude | symbol |
|---|---|---|---|---|---|---|---|
| MTS NEGERI 1 | 76.42 | 73.29 | 66.59 | 74.84 | 0.511398 | 101.453651 | |
| MTS NEGERI 3 | 57.73 | 51.33 | 52.57 | 59.72 | 0.470775 | 101.46079 | |
| MTS NEGERI 2 | 40.42 | 44.38 | 41.05 | 59.74 | 0.626801 | 101.423679 | |
| MTS DARUL HIKMAH | 43.44 | 41.56 | 42.98 | 61.42 | 0.469982 | 101.399077 | |
| MTS HASANAH | 39.78 | 35.39 | 41.98 | 49.09 | 0.504412 | 101.447018 | |
| MTS BUSTANUL ULUM | 39.07 | 36.16 | 36.17 | 57.88 | 0.507994 | 101.505548 | |

**Spatial Analysis and Kriging Interpolation**

Spatial Analysis is an analysis that maps a phenomenon accompanied by spatial data. Spatial data is a coordinate point or location of the phenomenon used, the location or coordinate point is a latitude and longitude point. The phenomenon referred to can be in the form of social events in the form of a violence index, crime index or school grades in a certain area. Phenomena can also be in the form of climate event values in the form of rainfall, wind speed, and temperature values. Spatial data provided by a phenomenon is usually very limited in a certain area, for this reason a mathematical formula is needed to get all spatial data at all coordinate points in a certain area. The completeness of this spatial data is the main key to mapping the phenomenon that can be done as a form of spatial analysis. The interpolation method is a method that is often used by researchers to obtain all spatial data in a certain area based on the limited spatial data provided at the beginning of the study (Fotheringham, et al., 2000). Several available interpolation methods have different advantages and disadvantages. One of the interpolation methods often used by researchers in conducting spatial analysis is Kriging interpolation. Several research publication results provide quite complete information about the Kriging method (Amri, et al., 2016; Amri, et al., 2017; Wackernagel, 1994).

Kriging interpolation can be divided into Ordinary Point Kriging, Ordinary Block Kriging, Co-Kriging, Universal Kriging (Olea, 1999). Universal Kriging is used for spatial data that has a trend (Kambhammuttu, et al., 2011). Universal Kriging can also be interpreted as an interpolation method used to deal with non-stationarity problems that arise in some of the spatial data provided at the beginning of the study (sample data). In this study surfer software will be used. Surfer software is one of the best software that can carry out kriging interpolation on spatial data and visualize it in the form of a map of an area.

**Semivarogram**

Kriging interpolation can be determined by a mathematical equation known as a semivariogram, as shown below

$$\hat{\gamma}(h) = \frac{1}{2N(h)} \sum_{i-1}^{N(h)} \left[ \left( Z(x_i + h) - m(x) \right) - \left( Z(x_i) - m(x) \right) \right]^2$$

with

$\hat{\gamma}(h)$ : experimental semivariogram value with distance *h*

$Z\left(x_i\right)$ : value of observations in $x_i$

$Z\left(x_i + h\right)$ : value of observations in $x_i + h$

$m\left(x\right)$ : trend (drift) equation

$N\left(h\right)$ : number of point pairs within *h*

The semivariogram value in the equation above can be determined using 3 mathematical model approaches as shown in table 3. In general, the model has 3 variables, namely: sill (c), range (a) and distance (h). Mathematical solutions for these three models can be used with the

help of R software. R software provides a special package to discuss a given model, namely GStat R (Bivand, et al., 2013).

Tabel 2 - Models for Estimates Semivariogram

| Mathematical Models | Model equation |
|---|---|
| Spherical model | $\gamma(h) = \begin{cases} c\left[\frac{3}{2}\left(\frac{h}{a}\right) - \frac{1}{2}\left(\frac{h}{a}\right)^2\right], & h < a \\ c. & h \geq a \end{cases}$ |
| Gaussian model | $\gamma(h) = \begin{cases} c\left[1 - exp\left(\frac{-3h^2}{a^2}\right)\right], & h < a \\ c, & h \geq a \end{cases}$ |
| Exponential model | $\gamma(h) = \begin{cases} c\left[1 - exp\left(\frac{-3h}{a}\right)\right], & h < a \\ c, & h \geq a \end{cases}$ |

## 4. Results and Discussions

The development of science values consecutively for 4 years, starting from the 2015-2016 school year so that the 2018-2019 school year will be analyzed using spatial analysis in the form of mapping. Preliminary analysis needs to be done before the spatial analysis in map form is produced. Basic statistical analysis or better known as descriptive statistical analysis, as shown in Table 2 is the initial information that needs to be discussed in conducting this research. Initial information in the form of maximum, minimum, average and data variations is important information to describe the state of Madrasah students' ability to master science. In table 2 it can be seen that the ability of Madrasah students to master science is quite good, where the maximum ability of students for these 4 years is in the interval of 65 to 80. This maximum ability continues to increase so that the 2018-2019 academic year is the best achievement for Madrasah Tsanawiyah in Pekanbaru. The large variation value indicates the uneven ability of students in mastering science, this is also reinforced by the large difference between the lowest and highest student abilities in mastering science.

Table 3 - Descriptive Statistics of NEM

| | Min | 1st Qu | Median | Mean | 3rd Qu | Max | Var |
|---|---|---|---|---|---|---|---|
| UN 2015-2016 | 31.77 | 39.24 | 50.47 | 51.32 | 60.65 | 74.84 | 174.68 |
| UN 2016-2017 | 33.25 | 36.13 | 38.54 | 41.33 | 42.23 | 66.59 | 68.18 |
| UN 2017-2018 | 25.97 | 31.56 | 36.24 | 38.33 | 41.62 | 73.29 | 111.22 |
| UN 2018-2019 | 34.66 | 38.74 | 40.28 | 43.08 | 42.06 | 76.42 | 82.55 |

However, in the 2018-2019 academic year, student abilities have begun to be evenly distributed, indicated by the significantly reduced value of variation and the student's ability is centered on a fairly good score, namely 40.28. The achievements of Madrasah Tsanawiyah began to be taken into account, several scientific Olympiad championships were able to keep up with the achievements of public schools, even in certain branches Madrasas were able to outperform public schools. This achievement certainly illustrates that Madrasahs have turned into educational institutions that are in demand by students and become the trust of parents to entrust their children to be given general knowledge and religion

### Discussion

The ability of Madrasah Tsanawiyah to turn into an educational institution at the junior high school level that is able to compete with public schools will continue to be analyzed as a whole in the Pekanbaru City area. A map of the distribution of Madrasah students' ability to master science in the 2015-2016 academic year has been generated through kriging interpolation to obtain all scores at locations in Pekanbaru City. This value is marked with a different color, where the lowest value is yellow and increases with the greening of the color on the map, as shown in Figure 2. The distribution of science values with value intervals from 26 to 66 spreads throughout the city of Pekanbaru, only a small part of the area in Pekanbaru has the lowest scores between 26 and 36 and most Madrasas in the city of Pekanbaru have quite good grades in science. Madrasas in the northern region of Pekanbaru city have the best achievement in mastering science

while a small number of Madrasas in the southern region of Pekanbaru city have poor achievements in mastering science.

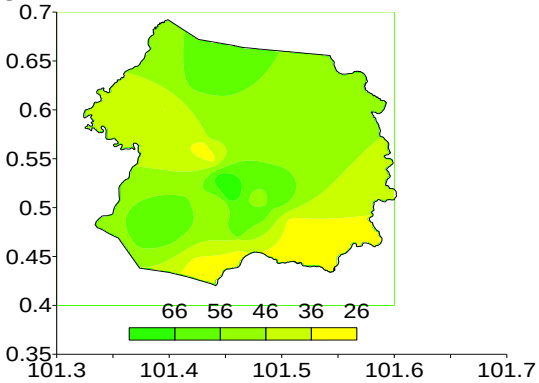


Fig. 2. The distribution of science grades for the 2015-2016 school year for Madrasahs in the city of Pekanbaru

The increase in the interval for science scores during the 2016-2017 school year for Madrasas in Pekanbaru city can be seen in Figure 3. This increase in scores is of course a reflection of the success of Madrasas in continuing to improve the quality of students in mastering science. The value of science has increased for the most part in the Pekanbaru area. Most of the West and East areas have science scores with a score range of 32 to 40 and a small number of urban center areas have the best performance with a large score range of 64 (Vallinkoski, et al., 2022; Ragazzi, 2018)

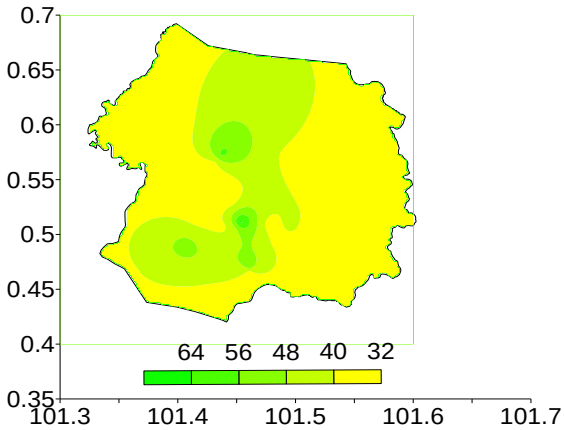


Fig. 3. The distribution of science scores for the 2016-2017 school year of Madrasahs in the city of Pekanbaru

The 2017 – 2018 academic year was marked by a change in the curriculum, this resulted in almost all madrasas not being ready to use this new curriculum. Madrasas in parts of the western and eastern areas of Pekanbaru city have a decline in science scores, while a small number of Madrasas in the northern city of Pekanbaru have the best achievement in science scores, as shown in Figure 4. This curriculum change has a significant effect on students' ability to master science

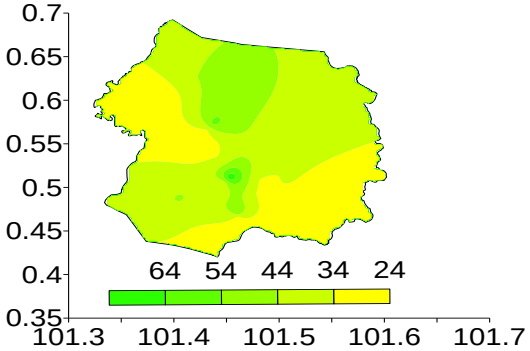


Fig. 4. The distribution of science scores for the 2017-2018 school year of Madrasahs in the city of Pekanbaru

Based on the experiences that have occurred in the 2017 – 2018 school year, the curriculum continues to be improved. The 2018 – 2019 academic year provides clear evidence that Madrasahs have succeeded in increasing students' ability to master science

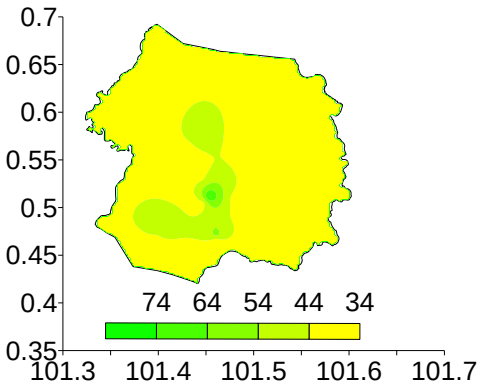


Fig. 5. The distribution of science scores for the 2018-2019 school year for Madrasahs in the city of Pekanbaru

Figure 5 shows that there has been an increase in the science score interval from 34 to over 74 for all Madrasahs in the Pekanbaru area. Some areas in urban Madrasah centers have succeeded in significantly increasing the value of science with a score of more than 74. Urban centers as areas that have complete facilities have indirectly influenced Madrasahs to improve the quality of learning outcomes. To see this, several coordinate points (latitude and longitude) will be selected in the urban center area as shown in table 4. The real locations such as the coordinate points given in table 4 can be seen in Figure 6. Figure 6 shows that various facilities in the urban center area and The atmosphere created can support the improvement of the quality of education. The results of this study can provide an overview to every Madrasah in Pekanbaru, it is very necessary to create a calm atmosphere and complete facilities in improving the ability of Madrasah students to understand subject matter.

Table 4 - Some of the coordinates of urban centers

| | Latitude | Longitude |
|---|---|---|
| Location 1 | 0.5227835083 | 101.451 |
| Location 2 | 0.5183505833 | 101.454324708 |
| Location 3 | 0.5094847333 | 101.456541142 |
| Location 4 | 0.5161341500 | 101.463190558 |
| Location 5 | 0.5238917833 | 101.457649417 |

The value of science in the 2018 – 2019 school year is not much different from the grades obtained by public schools (Thamrin, et al. 2019), it can be concluded that Madrasas with a number of lessons that exceed the number of public school lessons can compensate for the abilities of public school students in science lessons. This at the same time illustrates that Madrasas as an Islamic-based educational institution have succeeded in erasing the negative image that has been given as an institution that produces radical generations. Madrasas grow as educational institutions that are active in producing young people who have knowledge in religion and science (Sali, & Marasigan, 2020; Anwar, et al., 2019; Shaturaev, 2021).

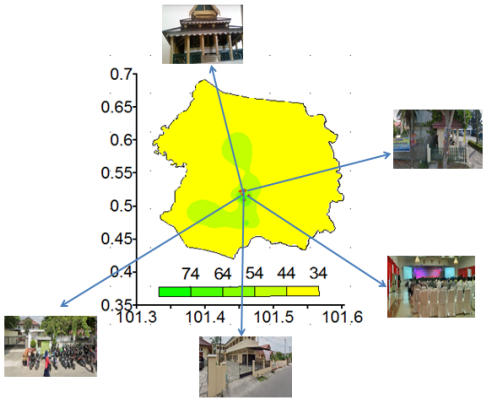


Fig. 6. Real location of several coordinate points of urban centers.

## 5. Conclusion

Spatial analysis carried out on four years of science learning values (2016, 2017, 2018 and 2019) at Madrasahs in Pekanbaru using kriging interpolation has succeeded in removing the

negative image given by foreigners as educational institutions that produce radical generations. Madrasas as Islamic religious-based educational institutions have proven that the students produced have good abilities in religion and science. Mapping the value of science for 4 years in a row since 10 years after the attack on the twin towers of the World Trade Center (WTC) in New York, has proven that Madrasas have made very significant progress in imparting scientific knowledge to their students. In the 2018-2019 school year, Madrasahs can confidently compete with public schools in achieving mastery of science. The dense activity of Madrasas in educating their students with religious knowledge and science is a guarantee that Madrasas have succeeded in erasing the bad image given by foreigners.

**References**


Abdallah, S.S., Suhailah Hussien, S., & Hisham, N.A. (2011). The Experience of Islamization of Knowledge at the International Islamic University Malaysia, in *New Intellectual Horizons in Education*, ed. Yedullah Kazmi (Kuala Lumpur: IIUM Press, 2011): 91-111.

Ahid, N. (2010). Problem Pengelolaan Madrasah Aliyah dan Solusinya. *Islamica: Jurnal Studi Keislaman, 4*(2), 336-353

Al-Hasani, S.M.A., Ismail, A.R., Kazeemkayode, B., & Elega, D.A.Q. (2017). Creating a Practicing Muslim: A Study of Qawmi Madrasah in Bangladesh. *British Journal of Education, Society & Behavioural Science, 20*(3), 1-9

Ali, M , & Furqon. (2016). Madrasah Students' Achievement: Study in Indonesia. *Global and Stochastic Analysis, 3*(3), 181-190

Ali, M., Kos, J., Lietz, P., Nugroho, D., Furqon, Zainul, A., & Emilia, E. (2011). *Quality of Education in madrasah: Main study* Jakarta: Ministry of Religious Affair

Amri, N.A., Jemain, A.A., & Fudholi, A. (2016). Optimization of spatial data sample for gold mineral prediction. *ARPN Journal of Engineering and Applied Sciences 11*(15), 9065-9068.

Amri, N.A., Jemain, A.A., & Fudholi, A. (2017). Consistency of the semivariogram-fitting error on ordinary kriging prediction, *ARPN Journal of Engineering and Applied Sciences, 12*(4), 2017: 990-995.

Andrabi, T., Das, J., Khwaja, A., & Zajonc, T. (2005). *Religious school enrolment in Pakistan:A look at the Data* World Bank Working Paper Series no3521

Anwar, L. M., Jufri, A. W., & Muhaimi, L. (2019). Application of Madrasah Based Management in Improving the Quality of Aliyah Madrasah Education. *International Journal of Multicultural and Multireligious Understanding*, *6*(5), 257-269.

Asadullah, M.N., & Chaudhury, N. (2016). To madrasahs or not to madrasahs: The question and correlates of enrolment in Islamic schools in Bangladesh. *International Journal of Educational Development, 49*, 55-69

Baba, S. B., Salleh, M. J., Zayed, T. M., & Harris, R. (2015). A Qur'anic Methodology for Integrating Knowledge and Education: Implications for Malaysia's Islamic Education Strategy. *The American Journal of Islamic Social Sciences, 32* (2): 1-27.

Benjamin, S., Gearon, L., Kuusisto, A., & Koirikivi, P. (2021b). Threshold of adversity: Resilience and the prevention of extremism through education. *Nordic Studies in Education*.

Benjamin, S., Salonen, V., Gearon, L., Koirikivi, P., & Kuusisto, A. (2021a). Safe space, dangerous territory: Young people's views on preventing radicalization through education—Perspectives for pre-service teacher education. *Education Sciences*, *11*(5), 205.

Bivand, R., Pebesma, E., & Rubio, V. (2013). *Applied Spatial Data Analysis with R (Second Edition).* New York: Springer

Fotheringham, A. S., Brunsdon. C., & Charlton, M. (2000). Quantitative Geography: Perspectives on Spatial Data Analysis. Newbury Park, CA: Sage Publications Ltd.

Hamidah Sulaiman, (2005). Pendidikan Islam dan pengaruh persekitaran dan kemajuan: Kesan kepada pembentukan sahsiah. *Jurnal Masalah Pendidikan*, 28, 71-78.

Hassan, M.K. (2010). A return to the Qur'anic paradigm of development and integrated knowledge: The Ulu al-Albab model. *Intellectual Discourse*, 18(2): 183-210.

Hoel, N. (2016). Exploring Women's Madrasahs in South Africa: Implications for the Construction of Muslim Personhood and Religious Literacy, *Religious Education*, *111*(1), 30-48.

Jerome, L., & Elwick, A. (2019). Identifying an educational response to the prevent policy: student perspectives on learning about terrorism, extremism and radicalisation. *British Journal of Educational Studies*, *67*(1), 97-114.

Kambhammettu, B., Allena, P., & King, J. (2011). *Application and evaluation of universal kriging for optimal contouring of groundwater levels*. J.Eart Syst. Sci.

Kasim, T.S.A.T., & Yusoff, Y.M. (2014). Active Teaching Methods: Personal Experience of Integrating Spiritual and Moral Values. *Religious Education*, *109*(5): 554-570.

Kudari, J.M. (2016). Survey on factors Influences the Student's Academic Performance. *International journal of Emerging Research in Management & Technology, 5*(6): 30-36.

Kustati, M., Indra, R., Ritonga, M., & Karni, A. (2023). The Effect of National Insight and Religious Moderation on Radical Behavior of Secondary School Students. *Education Research International*, *2023*.

Lintner, B, (2003). *Religious Extremism and Nationalism in Bangladesh* New Delhi: The Institute of Conflict Management, Faultlines

Lubis, M. A. (2015). Effective Implementation of the Integrated Islamic Education. *Global Journal Al-Thaqafah*, *5*(1), 59-68.

Lukens-Bull, R. (2010). Madrasa by Any Other Name: Pondok, Pesantren, and Islamic Schools in Indonesia and Larger Southeast Asian Region. *Journal of Indonesian Islam*, *4*(1), 1-21

Mansour, N. (2008). The Experiences and Personal Religious Beliefs of Egyptian Science Teachers as a Framework for Understanding the Shaping and Reshaping of their Beliefs and Practices about ScienceTechnology-Society (STS). *International Journal of Science Education*, *30*(12), 1605-1634.

Ma'zumi, & Jakaria. (2012). Contributions of Madrasah to The Development of the Nation Character. *International Journal Of Scientific & Technology Research* Volume 1, Issue 11 December 2012.

McGlynn, C., & McDaid, S. (2019). Radicalisation and higher education: Students' understanding and experiences. *Terrorism and political violence*, *31*(3), 559-576.

Muazza, M., Mukminin, A., Habibi, A., Hidayat, M., & Abidin, A. (2018). Education in Indonesian islamic boarding schools: Voices on curriculum and radicalism, teacher, and facilities. *Islamic Quarterly*, *62*(4), 507-536.

Olea, R.A. (1999). *Geostatistics for engineers and earth scientists*. United States of America: Kluwer Academic Publishers

Prijanto, J. H., Padang, A. T., & Susanti, A. E. (2019, June). Indication of the Effect of Radicalism on Christian High School Students, Lippo Karawaci. In *1st International Conference on Social Knowledge Sciences and Education (ICSKSE 2018)* (pp. 25-29). Atlantis Press.

Purwasih, J. H. G., & Widianto, A. A. (2020). School resilience and religious radicalism in senior high schools. In *Emerging Trends in Psychology, Law, Communication Studies, Culture, Religion, and Literature in the Global Digital Revolution* (pp. 98-101). Routledge.

Purwati, N., Zubaidah, S., Corebima, A. D., & Mahanal, S. (2018). Increasing Islamic Junior High School Students Learning Outcomes through Integration of Science Learning and Islamic Values. *International Journal of Instruction*, *11*(4), 841-854. https://doi.org/10.12973/iji.2018.11453a

Purwati, N., Zubaidah, S., Corebima, A. D., & Mahanal, S. (2018). Increasing Islamic Junior High School Students Learning Outcomes through Integration of Science Learning and Islamic Values. *International Journal of Instruction*, *11*(4), 841-854. https://doi.org/10.12973/iji.2018.11453a

Ragazzi, F. (2018). *Students as suspects?: The challenges of counter-radicalisation policies in education in the Council of Europe member states*. Council of Europe.

Rahim, H. (2004). Anatomi Madrasah di Indonesia. *Edukasi: Jurnal Penelitian Pendidikan Agama dan Keagamaan, 2*(2), 23-35

Rao, N. & Hossain, M.I. (2011). Confronting poverty and educational inequalities: Madrasas as strategy for contesting dominant literacy in rural Bangladesh *International Journal of Educational Development, 31,* 623-633

Riyadi, I. (2015). Integrasi Nilai-Nilai Kecerdasan Emosional Dalam Kurikulum Pendidikan Agama Islam Di SMA: Perspektif Daniel Goleman [Integration of emotional Intelligence Values in Islamic Education Curriculum of Senior High Schools: Daniel Goleman's Perspective]. *Hunafa: Jurnal Studia Islamika, 12*(1): 141-163.

Rustham, N., & Arifin, M.A.A.R. (2012). Teaching Methodologies in a Weekend Madrasah: A Study at Jamiyah Education Centre, Singapore. *International Journal of Arts and Commerce (IJAC), 1*(2): 148-167.

Sali, A. H. A., & Marasigan, A. C. (2020). Madrasah Education Program implementation in the Philippines: an exploratory case study. *International Journal of Comparative Education and Development*, *22*(3), 201-217.

Shaturaev, J. (2021). Financing and Management of Islamic (Madrasah) Education in Indonesia. *Zeszyty Naukowe Politechniki Częstochowskiej Zarządzanie*, *42*(1), 57-65.

Sjøen, M. M., & Jore, S. H. (2019). Preventing extremism through education: Exploring impacts and implications of counter-radicalisation efforts. *Journal of Beliefs & Values*, *40*(3), 269-283.

Sjøen, M. M., & Jore, S. H. (2019). Preventing extremism through education: Exploring impacts and implications of counter-radicalisation efforts. *Journal of Beliefs & Values*, *40*(3), 269-283.

Sjøen, M. M., & Mattsson, C. (2020). Preventing radicalisation in Norwegian schools: How teachers respond to counter-radicalisation efforts. *Critical studies on terrorism*, *13*(2), 218-236.

Tan, C. (2014). Educative Tradition and Islamic Schools in Indonesia. *Journal of Arabic and Islamic Studies, 14*: 47-62.

Tan, C., & Kasmuri, A. (2007). Islamic religious education: Case study of a madrasah in Singapore In Tan, C & Chong, KC (Eds), *Critical Perspectives on Values Education in Asia* (pp 109-124) Singapore: Prentice Hall

Thamrin, H., Darussamin, Z., Zamsiswaya,Z., Yendra, R., & Fudholi, A. (2019). Analysis the Effect of Mathematics Subjects on Islamic School in Pekanbaru Region Using Spatial Analysis, *International Journal of Engineering and Advanced Technology*, *8*(4), 482-468

Vallinkoski, K., Koirikivi, P. M., & Malkki, L. (2022). 'What is this ISIS all about?'Addressing violent extremism with students: Finnish educators' perspectives. *European Educational Research Journal, 21*(5), 778-800.

Wackernagel, H. (1994). Cokriging versus kriging in regionalized multivariate data analysis. *Elsevier Science B V,* 83–92