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Islamic Values-Based Mathematics Learning for Secondary Schools in Islamic Boarding Schools

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Abstract

Islamic values have become a robust culture in the Islamic Boarding Schools (*Pesantren*), but very few mathematics teachers still use them in learning mathematics. This study aimed to explore learning mathematics based on Islamic values in junior high schools in Islamic boarding schools. This qualitative research uses a case study method at the Zamzam Islamic Boarding School, Banyumas Regency, Central Java, Indonesia. Two classes (class VII and class VIII) were selected as research subjects with different teachers. Researchers used in-depth interviews with teachers and students, observations, and learning documents to collect data. Data were analyzed interactively and inductively, continued until it was finished to be saturated. Activities in data analysis include data collection, data reduction, data display, and data conclusion. The results showed that mathematics learning in Islamic boarding schools was integrated with Islamic values in learning tools (syllabus, lesson plans, student worksheets) and the implementation of learning, such as materials, methods, media, and teacher leadership behavior in education.

Keyword: Islamic Values, Islamic Boarding Schools, Mathematics Learning

Abstrak

Nilai-nilai Islam telah menjadi budaya yang sangat kuat di pesantren, namun masih sangat sedikit guru matematika di pesantren yang menggunakannya dalam pembelajaran matematika. Tujuan penelitian ini adalah untuk mendalami pembelajaran matematika berbasis nilai-nilai keislaman di sekolah menengah pertama di pesantren. Penelitian ini merupakan penelitian kualitatif dengan metode studi kasus di Pondok Pesantren Zamzam, Kabupaten Banyumas, Jawa Tengah, Indonesia. Dua kelas (kelas VII dan kelas VIII) dipilih secara purposif sebagai subjek penelitian dengan guru yang berbeda. Untuk mengumpulkan data digunakan wawancara mendalam dengan guru dan siswa, observasi, dan dokumen pembelajaran. Data dianalisis secara interaktif dan induktif, dilanjutkan sampai selesai sehingga jenuh. Kegiatan dalam analisis data meliputi pengumpulan data, reduksi data, penyajian data, dan penarikan kesimpulan data. Hasil penelitian menunjukkan bahwa pembelajaran matematika di pondok pesantren terintegrasi dengan nilai-nilai keislaman baik dalam perangkat pembelajaran (silabus, RPP, LKS), maupun dalam pelaksanaan pembelajaran (materi, metode, media dan perilaku kepemimpinan guru) dalam pembelajaran.

Kata Kunci: Nilai-Nilai Islam, Pesantren, Pembelajaran Matematika

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Introduction

Islamic values in the *pesantren* are the souls that drive all activities to achieve their vision and mission (Zuhri, 2017). These values are built from the culture of the *pesantren* through exemplary, habituation, and attached to the subject matter. However, there are still very few mathematics teachers in *pesantren* who use it in mathematics learning. Islamic values in learning are intended to be Islamic values seen from the aspect of their teachings (Zuhri, 2017). The aspects of Islamic teachings include faith, worship, morals, and *muamalah* (Irawan, 2014; Lubis, 2016; Rosmini, Syamsidar, & Haniah, 2016). Learning mathematics based on Islamic values makes it easier for students to learn mathematics from a cultural context that is conditional on Islamic values (Rosmini, Syamsidar & Haniah, 2016).

Learning mathematics based on Islamic values in Islamic boarding schools is intended so that the reasoning process goes hand in hand with the process of internalizing values.to build a strong spiritual awareness because it is supported by a foundation of rational thinking. This is in accordance with Einstein that religion without knowledge will be blind and science without religion will be paralyzed (Deeson, 1974), Arshad (2011) asserts that in Islam there is no dichotomy because Islam is a religion that pays great attention to science (science and mathematics). Islam develops a mission to achieve happiness in the world and the hereafter and is based on the principle of tawhid which views that all knowledge is basically from Allah (Idri & Baru,2017). Science and Mathematics emphasize more on *kauniyah* verses while Islam emphasizes more on *qauliyah* verses (Mufid,2014). These two verses are the verses of Allah SWT which mutually reinforce one another.

So far, Islamic lessons are expected to function to instill Islamic values, as if only as an expression of rules, orders, and prohibitions (verbalist) and are dogmatic in nature so that they are less animating in life (Rusdiana, 2014). On the other hand, mathematics learning which functions to develop reasoning, communication, connection, and problem solving is not built from the context of life, which is culturally based on Islam, the result is less meaningful because the information received is not related to a schematic context built from everyday culture (Sakafudin, 2015). An important problem experienced by Islamic-based schools is the difficulty in realizing a holistic education pattern that believes that individuals can find their identity, meaning and purpose in life through their relationship with society, the natural environment, and spiritual values, involves intellectual, emotional, physical, social, aesthetic, and spiritual work together (Miller, 2005). In addition, due to the limited literature on the integration model, there are no clear curriculum guidelines, textbooks, media and learning resources to describe Islamic values in mathematical learning (Rahmi, et al, 2017; Sakafudin, 2015; Mupa & Chinooneka, 2015).

Teachers with all aspects of their thoughts, emotions, insights, attitudes, and behaviors as well as decisions taken should be an inspiration for students' role models to develop into figures of national and national generations with complete personalities (Sari, 2013). At least the teacher's behavior is one of the supporters in realizing the character education strengthening program (PPK), because it is the priority of national education (Sari,2013), namely religious, nationalist, independent, with integrity and cooperative (Sari, 2013). Soedjadi (2000) states that the objectives of learning mathematics in schools consist of formal goals (structuring reasoning and personal formation) and material goals (training problem-solving abilities).

In order for mathematical concepts to be useful and stored for a long time in students' long-term memory, the learning that is carried out should pay attention to the following matters, first, lessons must be meaningful (meaningful) to students; second, students are encouraged to develop what they learn in a rich way; third, students do coding when learning mathematics in the form of elaboration; and fourth,

students associate subject matter with self-experience as a form of self-reference effect (Matlin & Margaret W: 2012). In short, learning mathematics at Madrasah / *Pondok Pesantren* will be more effective because it is easier. According to Vygotsky (2019) effective learning includes three main points, as follows leads to student development, (developed through problem-solving settings, and focuses on helping students reach their development potential. To achieve effective learning is needed increasing the sensitivity that students are actively involved in the learning setting being developed, making interactive problem solving that leads to the learning process, presenting challenging questions, using ongoing assessments to monitor learning, creating opportunities for students to display their higher-order thinking skills (Vygotsky, 2019).

Jazuli (2012) suggests that there is a strong relationship between Islamic values, especially morals and mathematics learning achievement. The influence of morals on mathematics learning achievement is quite large, while the effect of achievement on morals is relatively small. Hartono (2011) emphasizes that science with scientific and divine dimensions can help students develop their reasoning to give birth to the understanding that God creates and regulates everything in the universe for the benefit of humans. Based on Ghufron's (2017) research, spirituality has a positive effect on student learning success, even spirituality can be a predictor of learning success. Gradini, Wahyuni, and Anshor (2017) emphasize that learning mathematics based on the Koran is more effective than conventional learning. Amaliah, Julia, and Riani (2013) stated that motivation and spiritual leadership style simultaneously influence lecturer performance. Hudha and Ekowati (2014) recommend the importance of integrating character education in mathematics and science, as an effort to integrate scientific thinking and behave wisely.

Therefore, a deeper study of the nature of holistic education is needed by integrating Islamic values in learning in general and learning mathematics. Based on the description above, the purpose of this study is how to deepen the learning of mathematics based on Islamic values in Islamic boarding schools, so that there is harmony between Islamic values and mathematical values. The hope is that the results of this study can contributing ideas to science, especially Islamic and mathematics knowledge. In addition, the results of this study are expected to be used as a reference for teachers, researchers, and the government in building math learning in *Pesantren* that can harmonize Islamic and mathematical values.

Methods

This research is qualitative research with a case study method. These methods chosen because effective to explore the efforts to integrate Islamic values in mathematics learning both at the level of developing learning tools and implementing learning. This means that there are initial proposals that theoretically show the belief that the integration of Islamic values in mathematics learning has occurred

in Islamic boarding schools. This research emphasizes the theoretical findings of empirical observation data in the field with inductive methods (finding theory from some data), generative, namely theory construction using data as evidence, constructive findings of theory / category construction through analysis and abstraction, and subjective, namely reconstructing the interpretation and interpretation of research results based on the conceptualization of the research subject (Creswell, 2015).

The data source in the form of research subjects used in this study was determined by the purposive sampling method. The data sources in this study were the teachers (T1 and T2), and students (S1 and S2) who were selected on the grounds that they were actors who played a role in the integration of Islam. Mathematics teachers as informants in the preparation and provision of learning tools, learning implementation, and learning leadership. Students as informants in the implementation of learning, teacher leadership in the perspective of students, document student learning outcomes, and activities during learning.

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Data collection techniques used semi-structured interviews, observation, document review, and field notes (Creswell, 2009)). Semi-structured interviews are used to collect data about phenomena (symptoms that exist in thoughts, ideas, feelings, ideas, and experiences). Especially the phenomenon of integration of Islamic values from mathematics teachers and students according to their respective capacities. The results of interviews or recording / interactions and / or events are explained or rewritten (written in text format or captured in the form of clear identification of sub-elements. Observations are used to gather more comprehensive information related to the process of integrating Islamic values in mathematics education. Sources of information. which will be explored through observation are facts

(documents, artifacts) and events (teacher and student activities) during learning in the form of teacher behavior, teaching-learning interactions, and student behavior related to Islamic values.

Researchers prepare in advance an observation guide which contains an explanation of the indicators of teacher behavior, the learning process and student behavior. Documents and artifacts are used to explore historical data on the education policy process which is directly or indirectly related to the notion of development. Islamic values and the implementation of education, including mathematics. The documents referred to include curriculum documents, articles, magazines, books, tabloids, print and electronic media coverage. and student behavior related to Islamic values. observation, the researcher prepares in advance the observation guide which contains the description of teacher behavior indicators, learning process and student behavior. Study the documents and artifacts used to explore historical data on the education policy process which are directly or indirectly related to the notion of development. Islamic values and the implementation of education, including mathematics.

The data analysis technique is carried out through the following steps, *first,* preparing raw data, transcription, field data, images, etc.; *second,* processing and preparing data for analysis such as interview transcripts, material scanning, sorting and arranging data according to information sources; *third,* reading all the data to capture an overview of what is contained in participant information; fourth, analyzing in more detail by coding the data. Coding is the process of processing material or information into writing segments before interpretation; fifth, applying a coding process to describe the arrangements, categories, and themes to be analyzed. Then make a more complex analysis by the researcher reading the entire description; the researcher extracts important statements from each description; statements are summarized into meanings which are then grouped into themes, and the researcher integrates themes into narrative descriptions.

Data analysis is inductive, namely analysis based on the data obtained, which is then developed into a hypothesis (Creswell, 2009). The hypothesis that is formulated based on the data is then searched again for the data and then the conclusions are drawn. Activities in data analysis include data reduction, data presentation, and drawing conclusions (drawing / variating). The hypothesis that is formulated based on the data is then searched again for the data and then the conclusions are drawn. Activities in data analysis include data reduction, data presentation, and drawing conclusions (drawing / variating). The hypothesis that is formulated based on the data is then searched for the data and then conclusions are drawn. Activities in data analysis include data reduction, data presentation, and drawing conclusions (drawing / variating).

Results and Discussion

Learning mathematics based on Islamic values in Islamic boarding schools is, in principle, an attempt by the teacher to develop mathematics learning in Islamic boarding schools by integrating Islamic values that have developed in the *pesantren* culture. The integration of Islamic values in mathematics learning is reflected in the learning tools and the implementation of learning.

Islamic Values-Based Learning Tools

In mathematics learning tools, Islamic values are integrated into the syllabus, lesson plans, and student worksheets, such as (1) in developing a syllabus of Islamic values that are reflected in Core Competence (KI), especially the values of faith (*akidah*) and values of worship which are reflected in KI-1 regarding spiritual attitudes, moral values are reflected in KI-2 regarding KI-2 about social attitudes, and *mu'amalah* values which are reflected in KI-3 and KI-4 regarding knowledge and skills in instilling the universe, (2) learning experiences, namely in the form of selecting activities and appropriate contexts between material and values capable of Islam. to demand an active role of students in internalizing values and constructing concepts or principles, (3) evaluation, namely the selection of evaluation methods that can reveal the spiritual and intellectual activities of students in the learning process such as the use of observation techniques, assignments, portfolios, journals, and essay tests, and (4) learning resources, namely the selection of related references. For the context of the contents of the Koran, Hadith, and *Hikayatus sahabah* in addition to other junior high school mathematics sources. In developing RPP Islamic values are reflected in the following components: (1) KI as described above, (2 Learning Objectives, namely the selection of the Islamic context in determining Audience (A), Behavior (B), Condition (C) and Degree (D), (3) The learning method is the determination of activities that allow students to be involved intellectually, spiritually, emotionally, and physically, and (4) learning resources, namely the selection of related references. for the context of the contents of the Koran, Hadith, and *Hikayatus sahabah* in addition to other junior high school mathematics sources. In developing RPP Islamic values are reflected in the following components: (1) KI as described above, (2) Learning Objectives, namely the selection of the Islamic context in determining Audience (A), Behavior (B), Condition (C) and Degree (D), (3) The learning method is the determination of activities that allow students to be involved intellectually, spiritually, emotionally, and physically. (4) learning resources, namely the selection of related references. for the context of the contents of the Koran, Hadith, and *Hikayatus sahabah* in addition to other junior high school mathematics sources. In developing RPP Islamic values are reflected in the following components: (1) KI as described above, (2 Learning Objectives, namely the selection of the Islamic context in determining Audience (A), Behavior (B), Condition (C) and Degree (D), (3) The learning method is the determination of activities that allow students to be involved intellectually, spiritually, emotionally, and physically.

In the development of worksheets, Islamic values are reflected in the preparation of objectives, instructions for use and material descriptions. In the instructions for use, the integration of Islamic values is associated with choosing a work procedure that requires students to experience Islam, for example reading a prayer first. In the description of the material, the integration of Islamic spiritual values is related to the use of Islamic contexts taken from the Koran, Hadith, examples of friends or simulation results as data providers in the development of learning materials. In the development of evaluation instruments, Islamic values are reflected in the selection of tools, objectives and evaluation methods that comprehensively reflect spiritual, social, knowledge and skills attitudes.

In the implementation of learning Islamic values are integrated into the development of materials, methods, media, and teacher leadership behavior in learning. The integration of Islamic values in the development of mathematical material found in this study is the Islamization of mathematics, Islamic mathematics, and interconnection. The Islamization of mathematics is to develop mathematical concepts, principles, and procedures from the context of Islamic practice. For example, from observations of learning and field notes it was found that mathematics learning in PLSV material was developed through the context of undergoing worship, in particular a trip to the mosque to establish congregational prayers which is described in the following case study:

> *Every time he heard the call to prayer, Amir's heart trembled and immediately stepped into the mosque. The mosque is 50 m away from his house which only takes 100 steps. If every step of the distance is the same, determine the equation. How many meters of distance each step takes?*

In developing the one-variable linear equation (PLSV) material the values of compliance, submission and servitude are integrated with the PSLV concept. In this case, attendance to the mosque is done on foot, which contextually is a mathematical event that describes the relationship between the distance from the house to the mosque and the distance each step is during the journey to the mosque. Because the final demand is an equation showing the relationship between the distance from the house to the mosque, the distance each travel step takes and the distance. In general, in this case, mathematics learning is developed from the context of Islamic practice activities that have been cultured in *pesantren*, then packaged in pictures / videos, equipped with the necessary data, and used mathematical symbols so that they become concepts, presented in Figure 1.

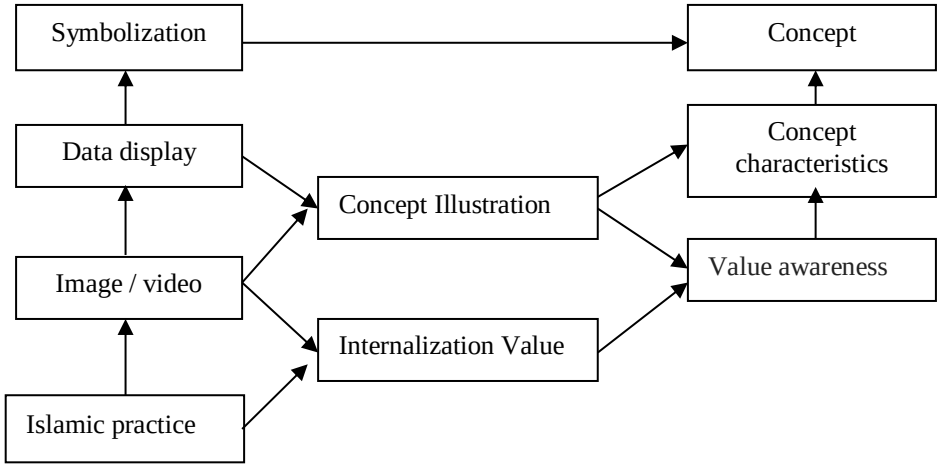

Figure 1. The process of Islamization of Mathematics

Meanwhile, Islamic mathematics is an attempt to interpret symbolic facts, mathematical concepts / principles as a source of inspiration for Islamic values that can build spiritual awareness through analogy. For example, in straight line material students are asked to connect two different points and make as many lines as possible through these two points (investigation activities). Then the students are asked to find how many straight lines can be made through the two points. Finally, students find that there is only one straight line through the two points (concept discovery). Then the straight-line image is analogous to *sirotholmustaqiem*, which is the journey of life from the world to the hereafter which is safe only if we follow the path of God (the concept of life). In general, in this case, mathematics learning is developed from observations of mathematical activities, then the model is described, its characteristics are identified, interpreted denotatively towards mathematical concepts, and interpreted metaphorically into a life concept. Furthermore, sequentially it can be displayed as in Figure 2.

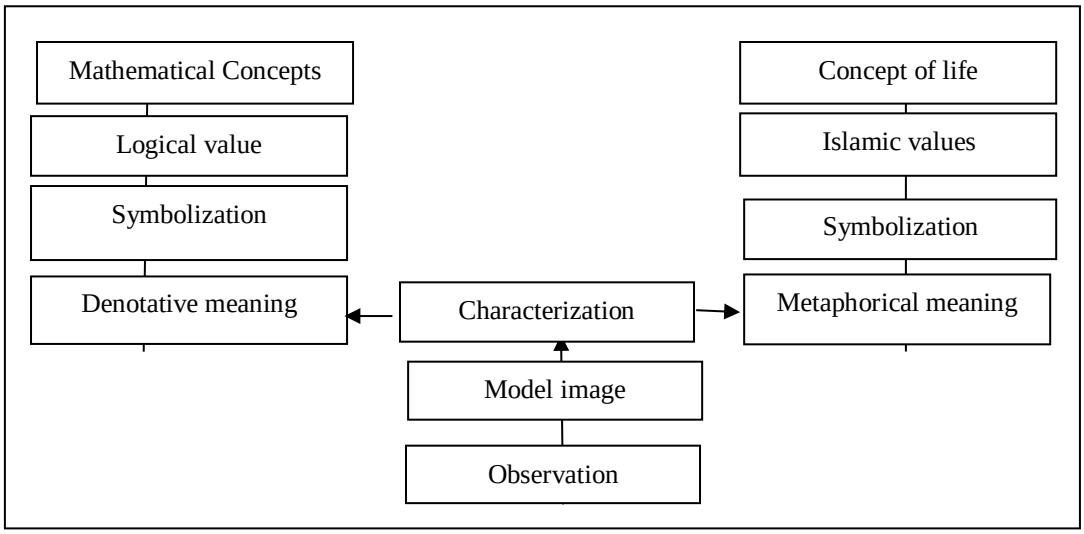

Figure 2. The process of Islamic Mathematization

The interconnection is to build a mathematical concept from an Islamic cultural context conditional on Islamic values and use that concept as a source of inspiration to increase spiritual awareness. For example, developing the concept of a two-variable linear equation system by taking the context of the spirit of the sacrifice of Abubakar and Umar in spreading their wealth in the way of Allah SWT because of the following:

When the Prophet called his friend to sacrifice his property fi sabilillah, Umar said in his heart, this time I will divide the treasure into two parts, I will give half of it to my family and part of it to the Prophet Muhammad for provision of fisabilillah. Then Rasulullah (saw) asked, "O Umar, did you leave anything for your family?" Umar replied, "Yes, Rasul, I leave them half of my wealth". Then Abubakar came with all his assets. The Prophet asked him, "O Abu Bakr, what did you leave for your family?" Abu Bakr replied, "I leave them Allah and His Messenger".

a. If the total assets of Umar that were handed over to the Prophet Muhammad turned out to be the same as the assets of Abu Bakr, whereas if the amount of assets collected from the two companions turned out to be worth 500 million, what is the mathematical model?
b. If what is stated in part a is true, what is the value of the assets of Umar and Abu Bakr respectively? solved by elimination and substitution.
c. What do you think about the spirit of sacrifice from friends? Explain!

In presenting the problem above, there are two important components, namely the stimulus in the form of narration, pictures, situations, or data that are used as a basis for making questions and problems. The stimulus chosen was in the form of exemplary companions of the Prophet in realizing Islamic values, especially awareness of one's existence as a servant of Allah and his responsibilities in life. This stimulus contains spiritual messages that are reflected in the behavior of the characters shown in the narrative, namely: (1) the spirit of sacrifice to invest its assets in the way of Allah which reflects the power of faith, namely faith. His treasure is a mandate from God which must be grateful to be used according to His will, (2) competing in goodness that reflects the spirit to realize the best good deeds in his service to Allah, (3) zeal to love God and His apostles more than His love for His possessions. From this stimulation there is also a display of data, namely the statement that: If Umar's assets handed over to the Prophet Muhammad turn out to be the same as Abu Bakr's assets, while adding up the assets collected from these assets. two friends turned out to be worth 500 million. Stimulus serves as a basic fact that has happened and is implemented in the life of a character. So, the stimulation of the problem above, the spiritual message is the spirit of sacrifice, while the relation to mathematics material is the relationship between the amount of wealth Umar and Abubakar sacrificed *fi sabilillah*. There is also a data view, which is a statement that: If

the amount of assets of Umar that was handed over to the Prophet was the same as that of Abu Bakr, whereas if the amount of assets collected from the two companions turned out to be worth 500 million. Stimulus serves as a basic fact that has happened and is implemented in the life of a character. Therefore, the stimulation of the problem above, the spiritual message is the spirit of sacrifice, while the relation to mathematics material is the relationship between the amount of wealth Umar and Abubakar sacrificed *fi sabilillah*.

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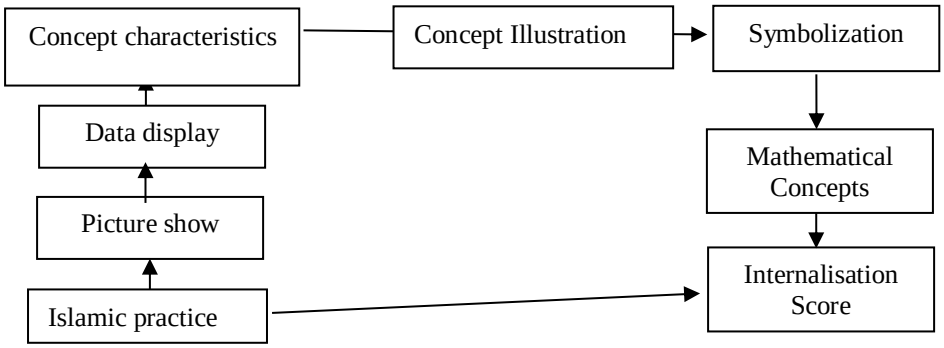

Figure 3. Interconnection

In the use of learning methods, Islamic values are integrated with the determination of activities that allow students to engage intellectually, spiritually, emotionally, and physically, such as the use of question and answer, storytelling, discussion, simulation, modeling, analogy, awareness. discoveries, and value clarification techniques. by emphasizing a scientific approach. In the use of instructional media, Islamic values are reflected in the choice of religious context, polite and Islamic images, Islamic names, and polite diction. The selection of congregational prayer videos apart from describing mathematical understanding, especially calculating the amount of reward promised, can also motivate students to increase the spirit of worship. The narrative uttered by the teacher can not only touch the students.

The integration of Islamic values in teacher leadership is called teacher spiritual leadership. In the spiritual leadership of teachers, Islamic values are integrated into the philosophy of leadership they adhere to. The leadership philosophy in question is spiritual leadership values extracted from mathematical concepts, such as the philosophy of the point (respect for the small), the philosophy of zero rank (humility), the philosophy of the calculator (choosing the best), the philosophy of universality. (adaptation), straight line philosophy (abiding by principles), circular philosophy (irritability, circular thinking), plus and minus philosophy (strengths and weaknesses).

Conclusion

Mathematical learning based on Islamic values can provide new insights and perspectives for the leadership of Madrasah / Islamic boarding schools, educators and educators, students and society at least updating the way of thinking, feeling and acting in a holistic way, namely that Islamic values are not can be separated from every line of life of the Muslim community in terms of thinking, how to feel, how to believe, how to behave, and how to behave anytime and anywhere in order to become a grace for all nature. The epistemology of mathematics (especially school mathematics) cannot be separated from Islamic values, especially the selection of a religious context so that the presentation of mathematics is more meaningful, more embedded in understanding and further strengthens the joints of the personality of students. In some ways, Mathematics learning based on Islamic values can provide new insights and ideas in developing teaching materials that are more holistic, contextual, and demand literacy to think and act based on Islamic law and *manhaj* according to the demands of Madrasah / *Pesantren*. and the Koran and the Sunnah of the Prophet. Mathematics learning based on Islamic values in education can provide new insights and ideas for Madrasah/ *Pesantren* in achieving educational goals either through direct learning (instructional effect) through dual or indirect curricula (nurturant effect) through a special integrated curriculum with Islamic values. Learning mathematics based on Islamic values can inspire

students to internalize Islamic values simultaneously and reinforce each other with the understanding process.

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