

The Effort Increasing Scientific Literacy of Zam Zam Muhammadiyah Cilogok Modern Islamic Boarding School

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Abstract

Purpose: Determine the participation of students and teachers at the Zam Zam Muhammadiyah Cilogok Modern Islamic Boarding School in seminar activities and scientific publications.

Methodology: The qualitative methods with a literature study approach. Data sources from www.google.scholar and www.sinta.kemdikbud.ac.id published articles in 2016-2023 use the words "Pesantren Zam Zam Muhammadiyah Cilogok", while data analysis uses content analysis techniques.

Results: From the 15 published articles, 1 national journal article was indexed by Google Scholar, 1 national seminar proceeding article was indexed by Google Scholar, 1 international seminar proceeding was indexed by Google Scholar and 12 reputable national journal articles were indexed by SINTA 3, 4, 5 and 6. The author's affiliation is not as a student or teacher at the Zam Zam Muhammadiyah Cilogok Modern Islamic Boarding School. Efforts are needed to increase scientific literacy at the Zam Zam Muhammadiyah Islamic boarding school by achieving scientific literacy indicators. Efforts to increase seminar activities through teacher competency, student interest, self-confidence and language mastery skills. Meanwhile, efforts to increase scientific publications include the promotion of Islamic boarding schools, recommendations for scholarships, and training in scientific publications.

Implication: Better scientific literacy for students and teachers at the Zam Zam Muhammadiyah Cilogok Islamic boarding school will increase participation in seminar activities and scientific publications

Applications/Originality/Value: the importance of assessing scientific literacy in modern Muhammadiyah Islamic boarding schools to increase participation in seminars and scientific publications.

Introduction

Islamic educational institutions that are unique in their learning models and characteristics both in Indonesia and even in the world are Islamic boarding schools. With five important components in it, including Kiayi/teachers, santri/students, mosque/surau, books/lessons and dormitories/lodgings, it has become part of the classic Islamic education system (Dhofier, 2011).

Islamic boarding schools in Indonesia are currently developing both in urban and rural areas, this is supported by data showing 39,049 Islamic boarding schools with 4,175,555 students throughout Indonesia (Kemenag, 2022). Meanwhile, since the 46th Congress in Yogyakarta, the development of Muhammadiyah Islamic boarding schools has formed a nomenclature of Muhammadiyah Islamic boarding school development institutions at the central, regional and regional levels to carry out better coordination and operationalization (Miswanto, 2019).

After the 48th Muhammadiyah Congress which will be held at the Muhammadiyah University of Surakarta, it will be an important momentum for the revitalization of the development of Muhammadiyah Islamic boarding schools, whereby 2022 there will be 440 Muhammadiyah Islamic boarding schools (PontrenMu) spread across Indonesia with the spirit of building quality-based Muhammadiyah education. Islamic boarding school (UMM, 2022). One of the distinctive characteristics of the Muhammadiyah education model includes the madrasa system, the Islamic boarding school system and the takhasus system which combines and modernizes education as a reconstruction of the Muhammadiyah school system or takes the form of post-modernization of Muhammadiyah schools (Kuswandi, 2020).

One of the problems in Indonesia, including in the world of education and Islamic boarding schools, is the low level of literacy, which OECD (2018) places Indonesia at number 74 with a composition of reading literacy at 74, mathematics literacy at 73 and science literacy at 71. Focus on Scientific or scientific literacy in Islamic boarding schools will provide better space or contribution, where, especially in modern Islamic boarding schools, most of them have libraries and laboratories that support conducting seminars and scientific publications.

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In another sense, scientific literacy is a person's ability to apply their knowledge to identify questions, reconstruct new knowledge, explain scientifically, make decisions based on scientific evidence and be able to develop a reflective mindset so that they can participate in overcoming issues or ideas related to scientific knowledge (OECD, 2019).

The problem with scientific literacy in Islamic boarding schools is that the majority cannot interact well with science subjects due to their lack of literacy (Rifauddin et al., 2020). Then, the issue of literacy, as stated by Maskur (2019), is an interesting issue for Islamic boarding school circles, which are characterized by a culture of reading, writing and studying, which is experiencing a setback due to developments in technology and information.

In the researcher's opinion, this statement is not fundamentally sound, in fact, with the development of digital information, the ease of obtaining reading material should become wider, especially in looking for references with a high level of reputation. This is supported by the opinion Agussalin dan Handayani (2023) that with the development of digital information technology, there are now more and more applications and websites that provide the best reference sources and easy reference database systems.

The development of scientific literacy for Islamic boarding schools is an important means of providing early education to students and teachers through the habit of reading, studying and analyzing better reading sources, which is then carried out in the habit of writing and presenting at seminars and publishing in reputable journals or proceedings. According to this Gallagher (2012), building scientific skills is very supportive of improvements in science learning, especially in discussing complex scientific disciplines and diverse phenomena.

The low level of scientific literacy skills is not only due to a lack of experience applying scientific methods in learning, it is also still oriented towards understanding concepts alone, causing students to not be used to understanding graphs, concluding quantitative data and evaluating validity and scientific information (Prabowo & Fidiastuti, 2017). For this reason, the role of Islamic boarding schools in providing guidance and training to students and teachers regarding scientific writing and publications is very important.

How to measure scientific literacy Azura et al., (2021) explained that using a scientific literacy framework is a popular approach to designing scientific literacy instruments by building, adopting or adapting a scientific literacy framework, or reconstructing an existing framework to create a new framework in their efforts to create scientific literacy instruments. This is useful in helping researchers conduct research whose main objective is increasing scientific literacy or measuring scientific literacy.

Scientific literacy skills are very much needed for the development of students' mindsets in high school as a training process in problem-solving. For this reason, scientific literacy conceptually focuses on the ability to make decisions based on scientific considerations, solve problems and apply the knowledge gained in everyday life (Istiyadi & Sauqina, 2023). How does scientific literacy as an object attach great importance to the authors and affiliations they write about in scientific proceedings and publications?

Educational institutions or organizations take into account the affiliation or relationship between the author's name and the institution that houses him as an official identity or recognition of identity, capacity and capability. Another definition of author affiliation is the practice of promoting certain services or information through links in the resulting author affiliation. This indicates that the more affiliates that emerge from a scientific publication, the more other authors will know and follow it in their scientific writing (Hottenrott et al., 2021).

Institutions have an important role in academic research. This impacts researchers' work because they control access to research resources, networks, and infrastructure, thereby partly determining scientific discovery (Ouda & Ahmed, 2015). Institutional affiliation also influences the value assigned to individual researchers through institutional prestige, which impacts research and career trajectories. Science policy is increasingly increasing the value given to institutions, through the use of domestic and international rankings and the introduction of performance-based institutional funding mechanisms that are believed to encourage better research performance (Salmi, 2016).

The explanation above provides an illustration that Islamic boarding schools as educational institutions whose authors are students and teachers, by increasing scientific literacy through seminars and scientific publications, will produce many works by increasing wider promotion of Islamic boarding schools and of course, improving the quality of publications and active participation in seminars. national or international which can be published in seminar proceedings as well as published in international proceedings and journals.

Why is one indicator of the quality of education assessed by the literacy index? This describes the level of learning achievement and scientific literacy skills of students as an assessment of a country's participation in the current quality of education. Why is the modern Zam Zam Muhammadiyah Cilongok Islamic boarding school the object of this research? It is the largest Muhammadiyah Islamic boarding school in Central Java with 1800 students and the second largest in Indonesia and has collaborated with various Muhammadiyah universities, and international standard schools both at home and abroad.

Previous research by Badruzzaman et al., (2023) studied increasing the literacy of students in Islamic boarding schools using digital libraries with qualitative methods. Then Muslihati et al., (2023) discussed the scientific literacy skills of students in Islamic boarding schools using a hybrid project-based learning model aimed at seeing the participation of students in seminar activities and scientific writing competitions. Meanwhile, this research examines the role of the Zam Zam Muhammadiyah Cilongok modern Islamic boarding school in scientific literacy through seminar activities and

scientific publications oriented towards the author's affiliation as a student or teacher in scientific proceedings or publications using qualitative methods and a literature study approach.

Method

This research uses a qualitative method with a literature study approach. As stated Yaniawati (2020), the concept of library or library study includes a series of activities related to obtaining library data, reading and taking notes, as well as processing research materials. Meanwhile, the literature study includes an analysis of many reference materials and previous research findings which function as a source of theoretical foundation related to the existing research subject (Mestika, 2008).

Meanwhile, data collection uses content analysis techniques which are obtained by recording and systematizing what is discussed in one topic and depth using the words "Pesantren Zam Zam Muhammadiyah Cilongok". Content analysis is a methodical examination of the substance of written or printed information in mass media. It is commonly used in qualitative research to gain a comprehensive understanding of the content (Haryoko et al., 2020). In collecting data using a systematic method from secondary data in the form of research results and research findings qualitatively or quantitatively (Snyder, 2019).

Search productivity using Zam Zam Muhammadiyah Cilongok as a research object or journal publication is still very limited, especially in journals of national reputation, namely SINTA or even international seminar proceedings and international journals.

Data comes from secondary data obtained from books, journals, magazines or bulletins. Literature search techniques were carried out on various national and international journal search platforms. To simplify the process of searching for relevant materials, the researcher used a set of pre-established criteria that aligned with the research questions as follows:

- a. Data obtained from the websites <https://scholar.google.com/> and <https://sinta.kemdikbud.go.id/>
- b. The data used ranges from 2016 to 2023.

Results and Discussion

The research findings obtained from library sources were then categorized based on the Zam Zam Modern Muhammadiyah Cilongok Islamic Boarding School which is summarized in the following table:

Table 1. Content Analysis Tabulation

No	Authors and Year Publication	Proceeding/Journal	Indexing
1	(Iqmah & Lagiono, 2016)	Reputable National Journal	Sinta 5
2	(Kusnan, 2017)	Reputable National Journal	Sinta 4
3	(Harahap, 2017)	Reputable National Journal	Sinta 4
4	(Avifah, 2017)	Reputable National Journal	Sinta 5
5	(Suprpto, 2018)	Reputable National Journal	Sinta 4
6	(Hidayat & Hawanti, 2021)	Reputable National Journal	Sinta 5
7	(Ikhsani et al., 2021)	Reputable National Journal	Sinta 5
8	(Suwarsito et al., 2021)	National Proceeding	Google Scholar
9	(Kurniawan et al., 2021)	Reputable National Journal	Sinta 4
10	(Sulasih & Prasetiawan, 2021)	Reputable National Journal	Sinta 3
11	(Utama & Jamil, 2022)	National Journal	Google Scholar
12	(Ikhsani et al., 2022)	Reputable National Journal	Sinta 5
13	(Paramitha et al., 2022)	Reputable National Journal	Sinta 4
14	(Maulidian & Linggardini, 2022)	International Proceeding	Google Scholar
15	(Vadila & Gunawan, 2023)	Reputable National Journal	Sinta 6

The research findings above show that the number of national journal articles with the Google Scholar index is 1 article, the national seminar proceedings with the Google Scholar index are 1 article, the international seminar proceedings with the Google Scholar index are 1 article, the reputable national journal with the SINTA 6 index is 1 article, A reputable national journal with a SINTA index of 3 has 1 article, a reputable national journal with a SINTA index of 4 has 5 articles and a reputable national journal with a SINTA index of 6 has 5 articles.

The names of the authors and their affiliates in the published articles above show that they were not detected from the Zam Zam Muhammadiyah Cilongok Islamic Boarding School all of them were affiliated with universities.

From the results of the research above, it is necessary to describe this phenomenon based on the conditions of the Zam Zam Muhammadiyah Cilongok Islamic boarding school in answering the research objectives, namely by increasing scientific literacy, increasing participation in seminar activities and increasing scientific publications.

Efforts to Increase Scientific Literacy

The modern Zam Zam Muhammadiyah Cilongok Islamic boarding school is one of the references for Muhammadiyah Islamic boarding schools in Indonesia in developing curriculum and other indicators to improve the quality of education.

One of the indicators for achieving educational quality is scientific literacy, where all Zam Zam Muhammadiyah Cilongok teachers have the competency, namely a minimum bachelor's degree (S1), which of course during lectures deals with subjects with research methods, mathematics, basic natural sciences and statistics. This is a stimulation for the development of scientific literacy in teaching and learning for students. This condition thinks Putra et al., (2023) that prospective teachers or teachers should have good scientific literacy skills, this is important considering that teachers are the source of knowledge, media of knowledge and role models for students.

To achieve good scientific literacy, students and teachers at the Zam Zam Muhammadiyah Cilongok Islamic boarding school need to increase their studies or book reviews, write essays, write books, be active in scientific seminars both as participants and presenters, actively write in reputable journals, provide the latest reference sources, adequate information and technology facilities and good collaboration with students and teachers. The same thing was expressed by Maskur (2019), increasing scientific literacy in Islamic boarding schools by developing libraries, collections of reference sources and the habit of reading and writing.

To achieve better scientific literacy, Islamic boarding schools should aim to achieve scientific literacy indicators using the Test of Scientific Literacy Skills (TOSLS) approach which is an instrument for measuring scientific literacy. This means knowing how to deal with problems in everyday life, including learning and literacy skills so that in the future it will improve the literacy index in Indonesia as per the target for achieving scientific literacy below:

Table 2. Indicators of Scientific Literacy Achievement

Scientific Literacy Aspects	Indicator	Achievement
Understanding the Scientific Method	Identify valid scientific ideas	Able to link arguments with scientific evidence
	Evaluate the validity of library sources	Able to identify the accuracy and credibility of library sources
	Evaluate the use and misuse of scientific information	Gives the same weight without the level of validity
	Understand the elements of research methods and their impact on scientific findings	Able to understand the elements of good research design
Managing, Analyzing and Interpreting Scientific Data	Define a graph that depicts the data	Able to create and understand good table creation
	Read and interpret graphs depicting data	Able to interpret graphs with linear or exponential patterns
	Solve problems using quantitative skills, namely probability and statistics	Able to explain basic mathematical calculations
	Understand and interpret basic statistics	Able to interpret statistics in a scientific context
	Justify conclusions, diction and conclusions based on quantitative data	Able to formulate hypotheses and evaluate arguments with graphic data

Source: (Gormally et al., 2012)

Efforts to Increase Seminar Participation

A seminar is a scientific meeting activity to convey and discuss a problem with suggestions and responses through discussion to produce knowledge, understanding, interaction and joint solutions to the problem being studied. The aim of the seminar is a way to find a solution to a problem by conclusion. To take part in this activity requires a person's motivation and competence to convey and discuss according to their knowledge, skills and understanding of the topic being discussed.

Teacher Competency

Teacher competency or professionalism is very important for a teacher as his efforts to provide by his scientific and skill capacities and capabilities. Because the world of education is developing rapidly, teacher competence is required to adapt to the current climate and challenges. To improve this, teachers need to be active in attending national or international seminars and are even highly appreciated as resource persons or panellists in these seminar activities.

With the activeness of a teacher, seminar activities should be attended frequently to find out more about developments in the world of education in other places and include exploring the development of education at the Zam Zam Muhammadiyah Cilongok Islamic boarding school to the public as a reference or point of reference for exchanging experiences and opinions in the world of Islamic education, as with Amaliyah et al., (2023) argue that by increasing teacher participation in seminar or workshop activities, it will accelerate the realization of the function, role and position of teachers by their academic qualifications, competencies and educational certificates.

Student or Santri Interests

Islamic boarding schools are Islamic educational institutions that provide a variety of academic and non-academic activities, one of which is extracurricular which helps students' interest in certain fields. Extracurricular activities are inseparable from academic activities at school which are carried out outside school hours to create and increase their interests, talents and potential. The process is that increasing students' interest in certain fields, will increase knowledge, develop interests, abilities, achievements and skills for the individual and interact more broadly with society.

The Zam Zam Muhammadiyah Cilongok Islamic boarding school needs to facilitate and actively invite students to participate in national or international seminar activities, not only as participants but also as panellists or presenters in these seminars. This will increase students' interest in seminar activities, this opinion is Pujangga et al., (2022) that providing opportunities and support for students to actively take part in seminars will increase interest in their field, especially being guided to become presenters in seminar activities.

Self-Confidence

By attending active seminar activities, teachers and students can increase their self-confidence, which aims to convince themselves of their abilities by developing positive values for themselves and the surrounding environment. Especially for students and teachers who often interact in Islamic boarding schools, they will gain an advantage by providing encouragement and motivation to each other to be confident in every activity.

Self-confidence is important as a form of good character so that it provides a good climate to achieve what is expected. For this reason, every student who increases their self-confidence will also increase their academic and non-academic roles. This is to the opinion Pujangga et al., (2022) that self-confidence will increase student achievement thereby providing opportunities for sustainable achievement.

Language Skills

The climate in Islamic boarding schools is very conducive to language development, including Indonesian, regional languages and international languages including Arabic and English. This is very important, as the Zam Zam Modern Muhammadiyah Cilongok Islamic boarding school integrates Arabic and English to become an identity for learning and habituation. This will support and make it easier to take part in seminar activities, including international seminars, not only as a participant but also as a presenter who presents in public, either online or offline.

The seminar activity is a place for students to hone their language skills with presentations and answering questions from the audience, of course this is given the opportunity and support from the Zam Zam Muhammadiyah Cilongok Islamic boarding school to develop and prepare them to attend and appear as presenters to improve language skills and as a competition for Islamic boarding schools at seminar activities. This benefit will provide a positive stimulant for students and Islamic boarding schools, the same thing was expressed by Syafitri et al., (2019) the activeness of teachers and students in seminars, it will improve their language skills if national seminars are in Indonesian and international seminars are in Indonesian. Arabic and English.

Efforts to Improve Scientific Publications

Scientific publications have become an effective medium for the academic development of students and teachers at the Zam Zam Muhammadiyah Cilongok Islamic boarding school, where currently the existing publications are in the form of physically printed Islamic boarding school bulletins with contributions from students, teachers and writers outside the Islamic boarding school. Of course, this can be improved by writing to scientific standards and publishing in scientific journals.

Promotion of Islamic Boarding Schools

Academic development through scientific publications can increase the promotion of Islamic boarding schools as an added value that triggers students and teachers to write and be published in reputable scientific journals, of course with an affiliation or link to the name of the Islamic boarding school. Unfortunately, until now researchers have not found any digital traces of journal articles published affiliated with the Zam Zam Muhammadiyah Cilongok Modern Islamic Boarding School in the form of national and international seminar proceedings as well as journals of national and international reputation.

This great potential should be utilized as best as possible as one of the characteristics and advantages of the Zam Zam Muhammadiyah Cilongok Islamic boarding school which has many affiliations in the world of scientific publications, especially with many citations. As explained Hottenrott et al., (2021), the more author affiliations in scientific publications, the greater the influence and potential benefits not only for the authors and their institutions but also for their country.

Then, authors with affiliations who improve articles in scientific publications will have the opportunity to obtain research funding or research assistance by collaborating to improve the professionalism of authors so that they need to develop common standards and facilitate changes in their scientific fields which in the end will promote the author's institution in scientific publications and research opportunities. broader (Davies & Edwards, 2015).

Promotion of Islamic boarding schools through scientific publications as credit points for communicating research findings to the public, showing appreciation and responsibility, achieving personal achievements and advancing career opportunities as well as increasing the reputation of the author's affiliated institution (Kharasch et al., 2021). Thus, the opportunity to promote the Zam Zam Muhammadiyah Cilongok Islamic boarding school by increasing scientific publications will increase promotion, benefits and potential not only for the author or institution but also for Indonesia.

Scholarship Recommendations

Most students hope to get a scholarship from the achievements or awards they get, scientific publications provide ample opportunities for every student to achieve their dreams by getting a scholarship at an educational institution that is considered very good and aspired to and getting a student exchange scholarship. Of course, this opportunity will not be wasted by the Zam Zam Muhammadiyah Cilongok Islamic boarding school, which is the second largest Muhammadiyah Islamic boarding school in Indonesia.

The same thing was expressed by Mali, (2022) scientific publications providing ample opportunities for their authors to obtain scholarships, educational assistance, research assistance and even international student exchanges. Then Butar Butar et al., (2023) by increasing the productivity of journal publications will get independent student exchanges that are in line with the goals they choose in Indonesia. Opening up scholarships by collaboration with other authors outside the affiliate and getting help with publication costs (Saputri et al., 2023).

Scientific Publication Training

With the many benefits and potential of scientific publications, of course, the Zam Zam Muhammadiyah Cilongok Islamic boarding school provides the opportunity for students to carry out basic training in writing, basic scientific publications and presentations. Then for teachers, scientific publication training is carried out periodically and the output is journal publications and seminars with the collaboration of santri and teachers at the Zam Zam Muhammadiyah Cilongok Islamic boarding school.

To prepare human resources as resource persons or trainers, the Zam Zam Muhammadiyah Islamic boarding school has collaborated with universities including Muhammadiyah Purwokerto University, Muhammadiyah Purworejo University, Muhammadiyah Semarang University, Muhammadiyah Jakarta University and Surakarta Muhammadiyah University which can be used as access to resource persons and journal publication media. As stated by Kurniawan et al., (2021), the Zam Zam Muhammadiyah Cilongok Islamic boarding school together with the Muhammadiyah Purworejo University carried out a research project on water design which ultimately led to a scientific publication. To make it easier to prepare scientific publication training materials as in the table below:

Table 3. Scientific Publication Training Activities

No	Activities
1	Basics of Writing Scientific Papers
2	Problems in Writing Scientific Papers
3	Looking for Quick and Accurate References in Writing Scientific Papers
4	Introduction to Online Journals, Selingkung Style and Introduction to How to Submit Articles in Online Journals
5	Practice Preparing Scientific Articles Individually and in Groups
6	Revision of Scientific Articles according to individual and group reviewer input
7	Online Guidance and Consultation according to Theme or Group

Conclusion

The Zam Zam Muhammadiyah Cilongok modern Islamic boarding school, as the largest Islamic boarding school in Indonesia, has great potential for scientific literacy through seminar activities and journal publications. Of the 15 articles obtained in 2016-2023 from national and international seminar proceedings, national journals and reputable national journals via www.google.scholar and sinta.ristekdikti with the words "Zam Zam Muhammadiyah Cilongok Islamic Boarding School" but none of the authors of the articles mentioned above are affiliated as students or teachers at the Zam Zam Muhammadiyah Cilongok Islamic boarding school.

Efforts are needed to increase scientific literacy at the Zam Zam Muhammadiyah Islamic boarding school by achieving scientific literacy indicators. Efforts to increase seminar activities through teacher competency, student interest, self-confidence and language mastery skills. Meanwhile, efforts to increase scientific publications include the promotion of Islamic boarding schools, recommendations for scholarships, and training in scientific publications.

The research implications of better scientific literacy for students and teachers at the Zam Zam Muhammadiyah Cilongok Islamic boarding school will increase participation in seminar activities and scientific publications. The limitation of this research is only using literature studies using a search engine for the words Zam Zam Muhammadiyah Cilongok Islamic Boarding School for the period 2016-2023. Future research requires an assessment of the scientific literacy

achievement index for students and teachers at the Zam Zam Muhammadiyah Cilongok Islamic boarding school using the Program for International Student Assessment (PISA) or Test of Scientific Literacy Skills (TOSLS) approach.

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