International Journal of Business, Law, and Education
Volume 4, Number 1, 2023

DISPARITY ANALYSIS OF THE LEARNING PROCESS OF ISLAMIC RELIGIOUS EDUCATION IN BANGKA BELITUNG PROVINCE: APPLICATION OF STATISTICAL PROCESS CONTROL (SPC)

Dinar Pratama[1a], Azhar[2b]

[1]IAIN Syaikh Abdurrahman Siddik Bangka Belitung, Indonesia

[2]UIN Ar-Raniry Banda Aceh, Indonesia

a) Corresponding author: dinar@iainsasbabel.ac.id

b) azhar.mnur@ar-raniry.ac.id

ABSTRACT

The problem of disparity in the learning process between Madrasahs is one of the contributors to the low quality of Madrasahs. To achieve the quality of learning, variability in the learning process must be suppressed to a minimum. Variability in the learning process can be in the form of differences in teacher competence, availability of learning facilities or facilities, financial capabilities of the Madrasah, and sociocultural factors of the Madrasah environment. Using a quantitative approach, this study aims to analyze the disparity in the learning process between Madrasah Aliyah (MA) in Bangka Belitung Province based on the achievement of UAMBN scores. Data analysis using the Statistical Processes Control (SPC) method with statistical techniques T^2. The SPC method generates a control chart that will be used to determine if there is a disparity among Madrasahs. The data analysis results show a disparity in the learning and teaching process at MA in Bangka Belitung Islands Province based on UAMBN's achievements in three subjects (Qur'an Hadith, Fiqh, and Islamic Cultural History). Some things that can be done by related parties to reduce disparities are 1) coaching all human resources (teachers and education staff) gradually, 2) equitable distribution of the number and quality of teachers, both in public and private, 3) controlling the admission of prospective students so that there is no inequality of interest, and 4) striving for proportional distribution of financial aid for each MA.

Keywords: Disparity, learning process, Islamic religious education, statistical process control

INTRODUCTION

Madrasah is an Islamic educational institution with the same position and status as other public schools in the national education system (Mariana &; Helmi, 2022). This recognition of equalization continues the enactment of the Joint Decree of the Minister of Religious Affairs, Minister of Education and Culture, and Minister of Home Affairs in 1975 (Muwafiqoh, 2023). Although the status of Madrasah has been recognized as the same as other public schools, the quality of the two institutions still has a significant disparity to date. One of the disparities between the two educational institutions can be seen in academic achievements both at the national and international levels.

Table 1. National Science Olympiad Medals High School/MA Level in 2022

No	Subject	Medals/School Category									
		SMA			Tot	%	MA			Tot	%
		Gold	Silver	Bron			Gold	Silver	Bron		
1	Matematika	4	4	13	21	91.3	-	2	-	2	8.7
2	Fisika	2	7	13	22	84.6	-	2	2	4	15.4
3	Kimia	4	10	9	23	79.3	1	-	5	6	20.7
4	Biologi	4	8	13	25	83.3	1	2	2	5	16.7
5	Informatika	3	10	10	23	85.2	-	-	4	4	14.8

No	Subject	Medals/School Category									
		SMA			Tot	%	MA			Tot	%
		Gold	Silver	Bron			Gold	Silver	Bron		
6	Astronomi	5	7	11	23	79.3	-	2	4	6	20.7
7	Ekonomi	3	8	13	24	80	2	2	2	6	20
8	Kebumian	4	5	14	23	76.7	1	5	1	7	23.3
9	Geografi	5	9	10	24	80	-	1	5	6	20

Data processed from the National Achievement Center of the Ministry of Education and Culture (Pusprenas Kemendikbud, 2022)

At the 2022 National Science Olympiad high school/MA level, more than half of the medals came from public or high schools. Of the nine competition fields tested, none of the competition fields can be seeded by Madrasah. Some test fields, such as Mathematics, Physics, Informatics, Astronomy, and Geography, did not get medals. As for high school, medals were obtained for all test fields. As for the junior high school / MTs level, no MTs received medals (Pusprenas Kemendikbud, 2022). The data in Table 1 above provides an obvious picture related to the quality of Madrasahs today. The quality of Madrasah, compared to public schools is still very high disparity. In fact, in quantity, the number of Madrasahs that are much less (82,128) (Ministry of Religious Affairs, 2023) than public schools (439,185) (Kemendikbudristek, 2022) should be more efficient in their management.

In addition, when viewed from the budget aspect, the difference in allocation from the two ministries is not too significant, where the Ministry of Education and Culture received an allocation of 72.99 trillion (13.4%) and the Ministry of Religious Affairs amounted to 55.85 trillion (10.3%) of the total 2022 State Budget of 542.84 trillion (Kemenristekdikti, 2022). Other national competitions that can also be used as an indicator of the quality of an educational institution are the Youth Scientific Writing Competition and the National *Young Inventor Awar*d (NYIA) which are routinely held by the National Research and Innovation Agency every year. Only 5 participants from Madrasah (MTs and MA) became winners in the 2022 Youth Scientific Writing Competition and NYIA competitions and the other 10 participants came from public schools (junior high and high school) (Wuragil, 2022).

Base on *outcomes*, graduates of the State University entrance examination results through the Computer-Based Written Examination (UTBK) in 2022 nationally are still dominated by public schools. Based on data from the College Entrance Test Institute, (2022), of the 100 schools with the highest rank, 11% are from MA and 89% are majority from public schools. In addition, Madrasah is also faced with the challenge of negative stigma of the community as a second choice in society (Anwar, 2018).

The comparison of achievement between schools and madrasahs as described above illustrates that quality disparities between schools and madrasahs still occur today. If there is no effort to overcome this disparity problem, the impact will not only occur at the national level, but can have an impact at the global level. The results of the 2018 *Program for International Student Assessment* (PISA) survey placed Indonesia in the bottom 6 out of 79 countries (Suprayitno, 2019). So, the high disparity in the quality of education in the regions can be the cause of low quality of education.

In the context of Bangka Belitung Islands Province, the quality of Madrasah based on achievement can be seen from the results of academic competitions both at the

local and national levels. In the 2022 Madrasah Science Competition, nationally the Bangka Belitung Islands Province only received one medal (3rd place) in the field of Integrated Geography for the MA/SMA level Direktorat KSKK Madrasah, 2022). For the National Science Olympiad, Bangka Belitung only got 2 medals, namely, the field of Astronomy at the high school / MA level gold medal and the Earth field at the high school / MA level bronze medal (Pusprenas Kemendikbud, 2022). None of the winners for OSN came from Madrasah. Meanwhile, when viewed from the outcome aspect, the results of the implementation of computer-based written exam (Higher Education Entrance Test Institute, 2022) show that, the number of Aliyah Madrasah in the Top 1000 category is only one, while for high schools there are 3 schools.

Madrasah educational institutions and schools, in the context of national education should not have much different disparities. Because the two institutions are basically also equally subject to the minimum standards of national education. Thus, the standards provided by Madrasah and schools should be the same and produce relatively the same output. So that efforts to map the disparity in the quality of education, especially Madrasah, are important to be carried out in order to get a more comprehensive picture.

Statistical Process Control (SPC) is one of the data analysis methods in statistics that can be used to provide an overview of the disparity of an ongoing process. In this context, the learning process is carried out in Madrasah. SPC was first developed by W. A. Shewhart, (1931). In early development, SPC was initially used to carry out process control in the industrial field. However, along with its development, SPC has been widely utilized in various fields including the field of services including education (Bi, 2022).

In the context of education, the application of SPC is used to control the learning and teaching process both in schools (Lee et al., 2017; Zurqoni &; Rahman, 2019) and in universities (Bi, 2022; Hanna et al., 2012). The development of research that applies the SPC method in the field of education is still very limited. Generally, to find out whether the educational process in an educational institution meets the expected quality is only done based on obtaining final grades. If the final score has exceeded the expected standard, the learning process can be said to be of high quality. This is precisely where the weakness lies. The final score on a person's academic achievement cannot be directly used as a benchmark for the quality of learning that has taken place. However, it is important to note whether the process is carried out under controlled conditions.

Naturally, the learning process is certainly influenced by several factors such as motivation (Gopalan et al., 2017; Schunk &; DiBenedetto, 2020), gender differences (Alam, 2022), the use of learning methods (Kintu et al., 2017), and the learning environment (Berkowitz et al., 2017). These factors are variables that can have a bad or good influence on learning. In practice, some of these variables are very difficult to know at the beginning or during the learning process. It is possible that some variables we can control such as, the learning environment. However, generally teachers find it difficult to control other variables beyond their knowledge. In terms of satistics, these variables can be termed variability.

Statistically, the performance behavior of a process can be expressed as a probabilistic distribution. Meanwhile, what will be the target of process quality control is the process target and process variability. Then these two goals can be expressed as location parameters and dispersion parameters of the distribution. For the first

parameter refers to the location where the distribution is concentrated. Then the second parameter refers to the spreading pattern of all possible values that one or a group of CTQ (*Critical to Quality*) that correlate with each other. If the distribution pattern is tightly concentrated, this indicates a good quality of the process (A. Djauhari &; E. Herwindiati, 2022).

In the SPC concept, control over absolute variability is exercised. According to Montgomery, (2020), to get the quality of a product must minimize variability. Thus, the more variability in a process, the lower the quality of the product produced. Even in the teaching and learning process, this variability is sometimes unavoidable. Therefore, to ensure the quality of learning, it is necessary to control the variability.

Based on this description, this study will focus on analyzing and understanding the disparity in the variability of the learning process and teaching of PAI MA in the Province of Bangka Belitung Islands by answering the following research questions, 1) is there a significant disparity in the variability of the PAI learning process among MA?, 2) if there is a disparity, which MA is significantly different from other MA?, 3) what are the recommendations that can be applied by the Supreme Court to reduce the disparity? The results of this research are needed by Madrasah managers and stakeholders to improve the quality of the learning process by reducing variability in learning processes. In addition, the results of the research can be taken into consideration to formulate policies for improving the quality of Madrasah.

RESEARCH METHODS

This research is a quantitative research using non-parametric statistical analysis. The data used is secondary data in the form of the average score of the National Standard Madrasah Final Examination (UAMBN) at the MA level in the subjects of Al-Qur'an Hadith, Fiqh, and Islamic Cultural History in the Bangka Belitung Islands Province.

Tabel 2. Sample of Data

Code	Madrasah	Subject Scores			Average
		Qurdis	Fikih	SKI	
M1	MA Negeri 1 Bangka	41.08	35.15	54.61	43.61
M2	MA Negeri 1 Belitung	42.10	34.42	57.48	44.67
M3	MA Negeri Insan Cendekia Bangka Tengah	70.43	63.48	72.87	68.93
M4	MA Negeri 1 Bangka Barat	42.57	37.68	58.32	46.19
M5	MA Negeri 1 Pangkalpinang	46.78	39.68	57.30	47.92
M6	MA Nurul Ihsan	37.39	32.25	51.90	40.51
M7	MA Nurul Ihsan	46.43	35.26	50.51	44.07
M8	MA Annajah Petaling	38.47	41.20	54.33	44.67
M9	MA An-Najah	47.29	34.29	52.13	44.57
M10	MA Al Islam	51.08	51.15	56.70	52.98
M11	MA Sabiilul Muhtadiin	50.23	39.61	47.28	45.71
M12	MA Daarul Abror	61.11	43.40	58.91	54.47
M13	MA Daarul Arofah	47.38	35.88	56.00	46.42
M14	MA Al-Hidayah	38.79	32.71	49.60	40.37
M15	MA Nurul Iman	56.25	46.50	72.50	58.42
M16	MA Darul Hikmah	36.21	30.60	40.76	35.86
M17	MA Nurul Qur'an	38.99	34.02	65.73	46.25

Code	Madrasah	Subject Scores			Average
		Qurdis	Fikih	SKI	
M18	MA Al Muhajirin	47.78	36.62	53.64	46.01
M19	MA Nurul Falah	57.97	51.23	65.91	58.37
M20	MA Al Ittihadiyah Al Islamiyah	30.34	30.19	41.14	33.89
M21	MA Miftahul Jannah	40.64	35.62	49.69	41.98
M22	MA Ikhlas Beramal	35.06	32.08	49.63	38.92
M23	MA Madinatul Ilmi	48.42	33.11	35.47	39.00
M24	MA Muhammadiyah Gantung	48.36	36.87	57.26	47.50
M25	MA Darussalam	44.79	35.37	57.42	45.86
M26	MA Hidayatussalikin	67.07	65.36	76.36	69.60

Based on the data in table 2, the sample in this study consists of 26 MAs in the Bangka Belitung Islands Province for the 2021/2022 academic year. The consideration of choosing UAMBN as data is because the 3 subjects in UAMBN are subjects that characterize the Madrasah. Data analysis techniques use statistical analysis methods T^2 (Hotelling, 1992). T^2 statistics are used to analyze multivariate process targets (p>1) or complex targets (A. Djauhari &; E. Herwindiati, 2022). In controlling SPC, generally the parameters of μ and ∑ are not known as in this study. Thus, it is necessary to assess in advance the two parameters. Thus, SPC is carried out through two stages, namely, the first is to assess the parameters and the second stage is control. The control measures as outlined by A. Djauhari &; E. Herwindiati, (2022) are as follows:

1. Define m of mutually free sample fruits and create a data vector that has m of the following vector.
$$X^1 = \begin{pmatrix} x_1^1 \\ x_2^1 \\ \vdots \\ x_p^1 \end{pmatrix}, X^2 = \begin{pmatrix} x_1^2 \\ x_2^2 \\ \vdots \\ x_p^2 \end{pmatrix}, \ldots, X^m = \begin{pmatrix} x_1^m \\ x_2^m \\ \vdots \\ x_p^m \end{pmatrix}.$$
2. Calculates the $\bar{X}$ average vector of m of such samples with the formula $\bar{X} = \frac{1}{m}\sum_{k-1}^{m} X^k$.
3. Data centring $X^k - \bar{X}$, where k moves from 1 to m.
4. Calculating the sample covariance matrix with formulas $S = \frac{1}{m-1}\sum_{i=1}^{m}(X^i - \bar{X})(X^i - \bar{X})^t$.
5. Determining the inversion matrix (S^{-1})
6. Calculate statistical values $T^2 = (X^k - \bar{X})^t S^{-1}(X^k - \bar{X})$,
7. Calculate the *Upper Limmit Control* (UCL) = $\frac{(m-1)^2}{m}\beta_{\alpha:u,v}$. For alpha (α) in this study it was set at 0.05.
8. Create a control chart T^2

For the process of processing and analyzing data, computing is used in Microsoft Excel.

RESULTS AND DISCUSSION

Based on the sample data in table 2, to create a control diagram using *statistics* T^2 first determine the mean vector value and $\bar{X}$ covariance matrix where the (S) $\bar{X}$

subjects Qurdis 46.7, Fiqh 39.4, and SKI 55.5. The average and covariance vector matrix is as follows:

$$\bar{X} = \begin{pmatrix} 46.7 \\ 39.4 \\ 55.5 \end{pmatrix} (S) = \begin{pmatrix} 93.72191 & 74.9124 & 61.27268 \\ 74.9124 & 85.11561 & 65.74232 \\ 61.27268 & 65.74232 & 92.96767 \end{pmatrix}$$

The next step is data centralization $X^k - \bar{X}$. The computation results can be seen in the table below:

Table 3 Data Centring

n	Qurdis	Fikih	SKI	n	Qurdis	Fikih	SKI
1	-5.574	-4.224	-0.907	14	-7.864	-6.66423	-5.91731
2	-4.554	-4.954	1.9627	15	9.596	7.125769	16.98269
3	23.776	24.106	17.353	16	-10.44	-8.77423	-14.7573
4	-4.084	-1.694	2.8027	17	-7.664	-5.35423	10.21269
5	0.1258	0.3058	1.7827	18	1.126	-2.75423	-1.87731
6	-9.264	-7.124	-3.617	19	11.32	11.85577	10.39269
7	-0.224	-4.114	-5.007	20	-16.31	-9.18423	-14.3773
8	-8.184	1.8258	-1.187	21	-6.014	-3.75423	-5.82731
9	0.6358	-5.084	-3.387	22	-11.59	-7.29423	-5.88731
10	4.4258	11.776	1.1827	23	1.766	-6.26423	-20.0473
11	3.5758	0.2358	-8.237	24	1.706	-2.50423	1.742692
12	14.456	4.0258	3.3927	25	-1.864	-4.00423	1.902692
13	0.7258	-3.494	0.4827	26	20.42	25.98577	20.84269

From the covariance matrix (S) then calculated inverse matrix (S^{-1}) with the following results:

$$(S^{-1}) = \begin{pmatrix} 0.036345 & 0.02972 & 0.00294 \\ -0.02972 & 0.05019 & -0.0159 \\ -0.00294 & -0.0159 & 0.02394 \end{pmatrix}$$

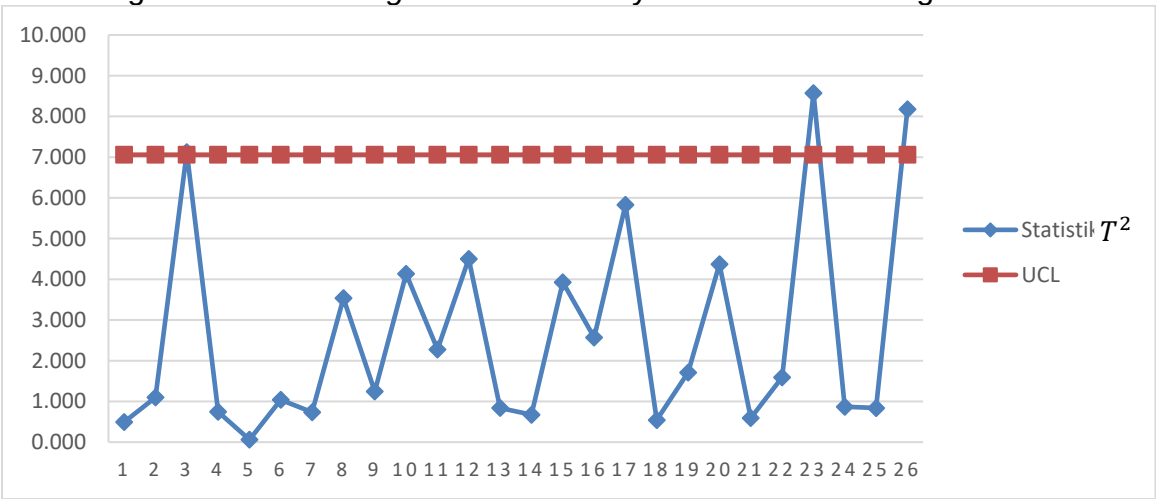
Table 4 Multiplication $X^k - \bar{X}$ by (S^{-1})

n	Qurdis	Fikih	SKI	n	Qurdis	Fikih	SKI
1	-0.074	-0.032	0.0618	14	-0.07	-0.00665	-0.01256
2	-0.024	-0.145	0.1392	15	0.087	-0.19764	0.265039
3	0.0968	0.2273	-0.038	16	-0.075	0.104727	-0.18305
4	-0.106	-0.008	0.106	17	-0.149	-0.20339	0.352178
5	-0.01	-0.017	0.0374	18	0.128	-0.14183	-0.00445
6	-0.114	-0.025	0.0539	19	0.028	0.093452	0.026987
7	0.1288	-0.12	-0.054	20	-0.278	0.252554	-0.15018
8	-0.348	0.3537	-0.033	21	-0.09	0.082994	-0.06212
9	0.1842	-0.22	-0.002	22	-0.187	0.072107	0.009141
10	-0.193	0.4407	-0.172	23	0.309	-0.04803	-0.3855
11	0.1472	0.0366	-0.211	24	0.131	-0.2041	0.076538
12	0.3958	-0.282	-0.025	25	0.046	-0.17583	0.114717
13	0.1288	-0.205	0.065	26	-0.091	0.365986	0.025686

Table 5 Statistical Values *of* T^2 and UCL For Each Sample

Sampel	T^2	UCL	Sampel	T^2	UCL
MA1	0.493421	7.059626	MA14	0.672148	7.059626
MA2	1.098712	7.059626	MA15	3.928395	7.059626
MA3	7.122619	7.059626	MA16	2.570706	7.059626
MA4	0.745434	7.059626	MA17	5.831096	7.059626
MA5	0.060407	7.059626	MA18	0.543404	7.059626
MA6	1.040383	7.059626	MA19	1.709757	7.059626
MA7	0.734891	7.059626	MA20	4.371034	7.059626
MA8	3.535513	7.059626	MA21	0.591078	7.059626
MA9	1.243711	7.059626	MA22	1.592057	7.059626
MA10	4.133664	7.059626	MA23	8.575126	7.059626
MA11	2.27673	7.059626	MA24	0.868451	7.059626
MA12	4.502339	7.059626	MA25	0.837229	7.059626
MA13	0.839846	7.059626	MA26	8.177881	7.059626

Figure 1 Control *Diagram* T^2 Variability of PAI MA Learning Process



Furthermore, the calculation results in step 6 are determining the statistical value of T^2 which is divided into 2 parts. The first part calculates the multiplication between the centralized data (table 3) and the matrix (S^{-1}). The second part calculates the statistical value T^2. The results of the calculation of T^2 for each sample can be seen in table 5. Figure 1 is a control diagram based on the statistical values T^2 and UCL.

The control diagram as shown in figure 1 shows that there are three Madrasahs above the UCL value. This indicates that all three MAs are outside the control value. The three MAs, M3 (MAN Insan Cendekia Bangka Tengah), M23 (MA Madinatul Ilmi), and M26 (MA hidayatussalikin) differ significantly from other MAs. Based on figure 5, these three MAs are represented by points outside the orange UCL curve. Thus, it can be concluded that the disparity in the variability of the PAI learning process between MAs occurs significantly.

Of the three MAs, M3 is a State MA and M23 and M26 are MAs with Private MA status. Based on figure 1, the variability of public and private MAs is different. Where in the state MA there is no high variability (M1, M2, M4, M5), except in M3. While in private MA (M7 – M26) variability looks quite high between MAs. Thus, it can be

understood that, differences in school status (public and private) are one of the aspects that cause disparities between MAs. In this regard, public MAs tend to perform better than private MAs. The results of a study conducted by Hanum, (2016) showed that there was an improvement in academic and non-academic quality in several madrasahs in Indonesia which initially united privately and then turned into the state. In addition, public interest in state madrassas has also increased after the change from private to state.

In the context of learning and teaching, private madrasahs also tend to be difficult to meet teacher qualifications, curriculum, financing, and facilities and infrastructure in accordance with standards (Alawiyah, 2014). The weakness of achieving these standards generally makes it difficult for private madrassas to compete with state madrassas. The difficulty of private madrassas meeting these standards is also greatly influenced by the financial capabilities of madrassas. Thus, serious efforts are needed from various parties in overcoming the disparity between public and private madrassas. Human resource development and financial assistance support to private madrasahs need to be improved to minimize these disparities.

In addition, based on the control diagram, disparity does not only occur between public and private MAs, but also occurs between public MAs and between private MAs themselves. For the State MA group, the disparity in the teaching and learning process in M1, M2, M4, M5 is relatively the same. However, there is a fairly high difference in M3. This happens because M3 is one of the State MAs that is included in the MA Excellence category. M3 implements a national selection system to obtain prospective students. Unlike the other four State MAs which are classified as regular MAs. In addition, M3 has better human, financial, and learning facilities in M3. The average achievement of academic scores on UAMBN M3 is also higher (68.9) than the other four state MAs (<50).

As for private MAs, there are two MAs (M23 and M26) with T2 scores > UCL scores which indicate that there is an unusual learning and teaching process or different from other private MAs. If you pay attention, the average achievement of UAMBN M26 score is the highest (69.6) among other private MAs, even when compared to 25 other MAs. This is very interesting because M26 is a private MA that can outperform public MA. As for M23, if you refer to the achievement of UAMBN scores, it is low.

In the context of improving the quality of the learning process in MA, the findings of this research are important to be followed up by related parties in this case by the Regional Office of the Ministry of Religious Affairs of Bangka Belitung Province for Madrasah. This disparity between MAs needs to be kept to a minimum. Because, if this continues to happen, it will have an impact on other things that may be more risky. The impact of this disparity will be felt in private MAs which tend to find it difficult to meet education standards. Private MAs are sometimes faced with the difficulty of obtaining prospective students because public interest tends to choose public MAs.

The importance of reducing this disparity is also basically the mandate of the law on the national education system no. 20 of 2003 article 11 which states that, "The Government and Regional Governments are obliged to provide services and facilities, and ensure the implementation of quality education for every citizen without discrimination" (Idrus, 2012) . So, quality education services and without discrimination are the rights of all citizens. This should be the basis for all relevant parties, both

central and local governments, to always ensure quality education services without exception.

CONCLUSION

There is a disparity in the learning and teaching process in MA in Bangka Belitung Islands Province based on UAMBN achievements in three subjects (Qur'an Hadith, Fiqh, and Islamic Cultural History). The results of the analysis through the *statistical* control diagram T^2 show that three MAs have T^2 values > UCL values which means that, the three MAs have variability in the learning and teaching process that is different from other MAs. The variability of the process that occurs between MAs needs to be suppressed to a minimum to avoid more serious impacts. Some things that can be done by related parties to reduce disparities are, 1) coaching all human resources (teachers and education staff) gradually, 2) equitable distribution of the number and quality of teachers, both in public and private MAs, 3) controlling the admission of prospective students so that there is no inequality of interest, and 4) striving for proportional distribution of financial aid for each MA.

REFERENCES

A. Djauhari, M., & E. Herwindiati, D. (2022). *Kontrol Kualitas Proses Kompleks: Teknik Statistikal Mutakhir Disertai Penerapannya di Berbagai Bidang Profesi dan Bisnis* (Cetakan ke). ITB Press.

Alam, A. (2022). Psychological, Sociocultural, and Biological Elucidations for Gender Gap in STEM Education: A Call for Translation of Research into Evidence-Based Interventions. *Proceedings of the 2nd International Conference on Sustainability and Equity (ICSE-2021)*, *2*. https://doi.org/10.2991/ahsseh.k.220105.012

Alawiyah, F. (2014). Pendidikan Madrasah di Indonesia. *Jurnal Aspirasi: Jurnal Masalah-Masalah Sosial*, *5*(1), 51–58. https://doi.org/10.46807/aspirasi.v5i1.449

Anwar, K. (2018). Peran sistem penjaminan mutu pendidikan dalam meningkatkan mutu pendidikan di madrasah. *TA'DIBUNA: Jurnal Pendidikan Agama Islam*, *1*(1), 41–56. http://dx.doi.org/10.30659/jpai.1.1.41-56

Berkowitz, R., Moore, H., Astor, R. A., & Benbenishty, R. (2017). A Research Synthesis of the Associations Between Socioeconomic Background, Inequality, School Climate, and Academic Achievement. *Review of Educational Research*, *87*(2), 425–469. https://doi.org/10.3102/0034654316669821

Bi, H. H. (2022). Applying statistical process control to teaching quality assurance at higher education institutions. In *Quality Management Journal* (Vol. 29, Issue 2). 10.1080/10686967.2022.2035288

Direktorat KSKK Madrasah. (2022). *Pengumuman Pemenang Kompetisi Sains Madrasah Tingkat Nasional*. Direktorat Jenderal Pendidikan Islam Kementerian Agama RI. https://ksm.kemenag.go.id/

Gopalan, V., Bakar, J. A. A., Zulkifli, A. N., Alwi, A., & Mat, R. C. (2017). A review of the motivation theories in learning. *AIP Conference Proceedings*, *1891*(1), 020043. https://doi.org/10.1063/1.5005376

Hanna, M. D., Raichura, N., & Bernardes, E. (2012). Using statistical process control to enhance student progression. *Journal of Learning in Higher Education*, *8*(1), 71–82. https://eric.ed.gov/?id=EJ1144975

Hanum, F. (2016). Evaluasi Penegerian Madrasah. *Al-Qalam*, *21*(2), 235. https://doi.org/10.31969/alq.v21i2.230

Hotelling, H. (1992). *The Generalization of Student's Ratio BT - Breakthroughs in Statistics: Foundations and Basic Theory* (S. Kotz & N. L. Johnson (eds.); pp. 54–65). Springer New York. https://doi.org/10.1007/978-1-4612-0919-5_4

Idrus, M. (2012). Mutu Pendidikan Dan Pemerataan Pendidikan di Daerah. *PSIKOPEDAGOGIA Jurnal Bimbingan Dan Konseling*, *1*(2). https://doi.org/10.12928/psikopedagogia.v1i2.4603

Kemendikbudristek. (2022). *Data Pokok Pendidikan*. Direktorat Jenderal Pendidikan Anak Usia Dini, Pendidikan Dasar Dan Pendidikan Menengah. https://dapo.kemdikbud.go.id/

Kemenristekdikti. (2022). *Pagu APBN Kemendikbudristek Tahun Anggaran 2022*. https://www.kemdikbud.go.id

Kementerian Agama. (2023). *Education Management Information System (EMIS)*. Kemenag RI. https://emispendis.kemenag.go.id/

Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended learning effectiveness: the relationship between student characteristics, design features and outcomes. *International Journal of Educational Technology in Higher Education*, *14*(1), 7. https://doi.org/10.1186/s41239-017-0043-4

Lee, S. L., Sagadavan, R., & Djauhari, M. A. (2017). Monitoring the disparity of teaching and learning process variability: a statistical approach. *International Journal of Productivity and Quality Management*, *21*(4), 532. https://doi.org/10.1504/ijpqm.2017.10005848

Lembaga Tes Masuk Perguruan Tinggi. (2022). *Peringkat Sekolah Berdasarkan Nilai UTBK*. Kementerian Pendidikan, Kebudayaan, Riset, Dan Teknologi. https://ltmpt.ac.id/

Mariana, D., & Helmi, A. M. (2022). Madrasah Sebagai Lembaga Pendidikan di Indonesia. *Jurnal Pendidikan Tambusai*, *6*(1), 1907–1919. https://jptam.org/index.php/jptam/article/view/3236

Montgomery, D. C. (2020). *Introduction to statistical quality control*. John Wiley & Sons.

Muwafiqoh, A. (2023). Inovasi dan Transformasi Pendidikan islam Melalui SKB 3 Menteri. *SAP (Susunan Artikel Pendidikan)*, *7*(3), 397–404. http://dx.doi.org/10.30998/sap.v7i3.15947

Pusprenas Kemendikbud. (2022). *Olimpiade Sains Nasional 2022*. https://pusatprestasinasional.kemdikbud.go.id/event/sains-dan-teknologi/sma/olimpiade-sains-nasional-2022-2022-sma

Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational Psychology*, *60*, 101832. https://doi.org/10.1016/j.cedpsych.2019.101832

Shewhart, W. A. (1931). Statistical Method from an Engineering Viewpoint. *Journal of the American Statistical Association*, *26*(175), 262–269. https://doi.org/10.1080/01621459.1931.10502545

Suprayitno, T. (2019). *Pendidikan di Indonesia: belajar dari hasil PISA 2018*. Badan Penelitian dan Pengembangan.

Wuragil, Z. (2022). *Daftar Siswa dan Asal Sekolah Pemenang LKIR dan NYIA 2022*. Tempo.Co. https://tekno.tempo.co/read/1651793/daftar-siswa-dan-asal-sekolah-pemenang-lkir-dan-nyia-2022

Zurqoni, & Rahman, F. (2019). Aplikasi Statistik Proses Kontrol Untuk Evaluasi Proses Pembelajaran Menggunakan Diagram Kontrol $\bar{X}$ dan R. *J Statistika: Jurnal Ilmiah Teori Dan Aplikasi Statistika*, *12*(2), 30–35. https://doi.org/10.36456/jstat.vol12.no2.a2226