ANALYSIS OF CLASS SIZE OF SENIOR HIGH SCHOOL (SMA) WITH NATIONAL EXAMINATION RESULTS IN INDONESIA

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ABSTRACT

This study aims to develop a rationalization strategy for class size through mapping school typologies and correlation analysis based on class size and the results of the National Examination at the Senior high school. Data in the research use quadrant analysis based on the class size and the results of the National Examination followed by correlation analysis. There were 9,565 schools that met the standards, reaching 76.14%. The number of students per class <20, number of classes <3 does not correlate significantly with the UNBK science and social studies results. Schools with the number of students per class <20 and rombel <3 are private schools that have the lowest UN scores compared to schools in other quadrants. The number of students per class and number of classes is not conditioned but because of a shortage of students. Correlation value in the quadrant with the number of students per class 20-36 and the number of classes >36 highest compared to other quadrant correlation values. Correlation value $r = 0.318$ IPA and $r = 0.305$ IPS. That schools have accreditation value above 93 and ensured the quality of the learning process is guaranteed which amounts to 98 schools (0.78%). Increasing the number of students per class and the number of classes per school is adjusted to the capacity of school resources and classrooms. However, SMA with the optimum UNBK score is in the position of the average number of class 33 and the number of students per class 36.

KEYWORDS

Class Size, National Examination and Senior High School

1. INTRODUCTION

One of the government’s policy in order of building an even access and education’s quality implementation is Zoning Education Policy. This policy is referred from UUD 1945 article 31 (after amendments), that explains about every Indonesian citizen reserve the right on getting a proper education and every Indonesian citizen is required to have primary education and had to be funded by the government. UUD 1945 then later derived in UU Number 20, 2003 about Education System National in article 1 paragraph, it’s explained that education is a conscious effort and planned to embodies learning situation and process so the students actively develop their own potentials to have a spiritual strength religiously, self control, personality, intelligence, noble attitude, and skills needed in each person, the community, and nation-wide.

In Permendikbud Number 22, 2016 about the Standard Process of Basic and Intermediate Education stipulated a restriction of the amount of people in a study group (Rombongan Belajar or Rombel) in each unit of the education level and each student in a study group.

Therefore the amount of rombel in primary school/MI are between 6 to 24 with the amount of maximum students per rombel are 28 students, for middle school/MTs the amount of students in one rombel is between 3 to 33 with the maximum amount of 32 students, for high school/MA the amount of students per rombel are between 3 to 36 with the maximum amount of 36 students, for
SMK the amount of students for the whole rombel are between 3 to 72 with the maximum amount of 36 students per rombel, for SDLB the amount of rombels are 6 with the amount of 8 students per rombel, for SMPLB the amount of rombels are 3 with the amount of 8 students per rombel, for SMALB the amount of rombels are 3 with the amount of 8 students per rombel. The requirement is regulated in attempt of effectivity in the education process. With the amount of students per rombel that suit the Permendikbud policy, is expected for the education process to work more effectively.

Based on the data below, for the minimum ratio of a classroom size for a middle school is 2 m²/student. For a big study group with a group of students less than 15 people, the minimum size of a classroom is 30 m² with the minimum classroom width of 5 m. For the maximum rombel in middle school/MTs level fits to 33 rombels.

A lot of areas proposed a flexibility for the amount of study group (rombel) surpassed the Permendikbud policy number 22, 2016 that indicates the rise of society’s animos to schooled their children in public schools. This case happens because the low of school distribution and there are still society’s stigma about “favorite school” that are more superior than the other regular public schools. For that, it needs to be researched on what is the correlation between a measure amount of students per class and an amount of study groups (rombels) per school and what are the impacts to the result of their studies.

This research has a purpose to construct rational strategies to measure study groups (rombel) through school’s typology mapping and correlation analysis based on the amount of students and the amount of rombels and national exam results in the high school level.

This research is using a quantitative approach. This research is delivered with a descriptive approach for school’s typology data and quadrant analysis based on the amount of study group (rombel), students in a rombel and national exam’s results. According to Best in Louis Cohen, Lawrence Manion and Keith Morrison (2007:203) a descriptive research focused on condition and available relations beliefs point of view or adopted attitudes and trends that are evolving. The variable in this research is the amount of study groups (rombel), the amount of students in a rombel and national exam’s results. This research will be continued with the analysis to find out the correlation between the amount of students per rombel with the quality indicator that are the result of school’s index based on national exam and pearson correlation analysis will be used on teachers. Correlation analysis is used to find out is there any relations between a big amount of students in class and the size of study group (rombel) with the result of student’s studies. This research will use the whole public and private high schools data in across Indonesia.

2. BODY OF PAPER

2.1 School’s Typology Based on the Amount of Study Group (rombel) With the Ratio of Students per Rombel

The issue that surfaces in some areas in Indonesia is the amount of students in a study group (rombel) are exceeding the standard, in middle school level surpassed 32 students. There are also schools that hold studies in study groups (rombel) with a huge amount of students in one school, in one school even surpassed 33 students in one rombel in middle school level. To find out the amount of schools in Indonesia that the rombels have qualified the standard or over the standard can be mapped with typologies based on the amount of rombels in school and the amount of students in rombels using kartesius diagram analysis or quadrant analysis.
Figure 19: Quadrant Based On The Amount of Rombels and Student’s Rombel Ratio In High School Level (N=12,562).

Source: Processed from Dapodikdasmen (2019) and PDSPK (2019).

Quadrant 1: Schools with the amount of rombels above standard that are 36 and the amount of students per rombel that are also above standard that are above 36, contains of 62 schools.

Quadrant 2: Schools with the amount of qualified rombel based on standard (3 – 36) and the amount of students per rombel above the standards that are above 36 students contains of 434 schools.

Quadrant 2.1: Schools with the amount of rombels below 3 and the amount of students per rombel above standards that are above 36 students, contains of 2 schools.

Quadrant 3.1: Schools with the amount of rombels below 3 and the amount of students per rombel that are not qualifying the standard that are not more than 36 students, contains of 15 schools. Quadrant 3.2: Schools with the amount of rombels above 3 and the amount of students per rombel below 20 students, contains 2257 high schools.

Quadrant 3: Schools with the amount of rombels qualified with the standard (3 – 36) and the amount of students per rombel are not surpassed the standard are not more than 36. There are 9,565 schools that are qualified with the standard, reaching 76.14%. In conclusion schools that are qualified with the standard have the biggest presentation. Quadrant 3.2.1: Schools with the amount of rombels below 20 and the amount of students per rombel below 3 contains of 129 high schools.

Quadrant 4: Schools with the amount of rombels above 36 and the amount of students per rombel that are not surpassed the standard that are not more than 36. Contains of 98 schools that are in this quadrant’s criteria. Quadrant 4.2: Schools with the amount of rombels above 36 and the amount of students per rombel below 20 students. There are no schools in this quadrant’s criteria.

2.2 Correlation of the Amount of Students Per Rombel with High School National Exam’s (UNBK) Results

Table 2: Correlation of the amount of students per rombel with the Science Studies (IPA) UNBK’s results

| QUADRAN | Jumlah Rombel | < 3 | 3 - 36 | > 36 |
|---------|---------------|-----|--------|------|
| Rasio Siswa/ Rombel | < 20 | r = 0.043 | r = 0.087 | n/a |
| | sig. = 0.840 | sig. = 0.001 | | |
| | n = 25 | n = 1511 | | |
| | 20 - 36 | r = 0.356 | r = 0.245 | r = 0.318 |
| | sig. = 0.557 | sig. = 0.000 | sig. = 0.002 | |
| | n = 5 | n = 8426 | n = 96 | |
| | > 36 | n/a | r = -0.171 | r = -0.041 |
| | sig. = 0.001 | sig. = 0.754 | | |
| | n = 369 | n = 62 | | |

Source: processed from Dapodikdasmen (2019) and PDSPK (2019) and Pusbendik’s UNBK Results
Correlations between the amount of 20 – 36 students and the amount of 3 – 36 rombels or qualified the standard either with UNBK IPA or IPS, have a significant correlation. In conclusion, most of the school that reached a higher UNBK score did their best on following the regulated standard.

Table 3: correlation of the amount of students per rombel with the social studies (IPS) UNBK’s results

| KUADRAN | Jumlah Rombel | < 3 | 3 - 36 | > 36 |
|---------|---------------|-----|--------|------|
| Rasio Siswa/Rombel | < 20 | r = -0.179 | r = -0.075 | n/a |
| | sig. = 0.217 | sig. = 0.001 | | n/a |
| | n = 49 | n = 1880 | | |
| | 20 - 36 | r = -0.415 | r = 0.247 | r = 0.305 |
| | sig. = 0.354 | sig. = 0.000 | sig. = 0.002 |
| | n = 7 | n = 8812 | n = 98 |
| | > 36 | n/a | r = -0.193 | r = -0.020 |
| | sig. = 0.000 | sig. = 0.878 |
| | n = 416 | n = 62 |

The correlation between rombels and UNBK’s results is similar between IPA’s UNBK result and IPS’ UNBK result. To see the more focused result, the amount of students per rombel than divided again to < 20, 20 -36 dan > 36. Quadrant’s division of the amount of rombel and students/rombel’s ratio are this followings:

The amount of students per rombel Quadrant <20 and the amount of rombels > 3. Based on the two tables above showed a correlation between the amount of student per rombel < 20 and the amount above rombel > 3 and with the result of IPA’s and IPS’ UNBK is not significant. In conclusion, students per rombel < 20 the amount of rombel > 3 are not significantly correlated with the result of IPA’s and IPS’s UNBK. The lesser amount of students do not always makes it easier for the teacher to push the students on having a good result on their UNBK. There are more factors that caused a lower national exam score. Schools with the amount of students per rombel below 20 and rombels > 3 are private schools that got the lowest national exam’s scores other than schools in other quadrants.

A research about study groups has been done in some countries. Christhoper Jepsen (2015) explained issues in study groups. For example in Israel, the amount of maximum students in class are 40. This means that schools with 39 students in class have one teacher with the class consists of 39, meanwhile schools with 42 students in class have two teachers with the average class consists of 21. This study in Israel showed smaller classes correlated with improvement of achievements that’s quiet significant for 5th grader, but has smaller effects for the 4th grader. In the limitation of “Per – Student” case, the effects is about 0.034 deviant standard for the 5th grader and about 0.018 for the 4th grader.

Fluctuation can increase or decrease based on the amount of student in some area, explained by Christopher Jepsen in the Texas Case, the 5th grader subtracted one student in a size of a class correlated to quality improvement 0.0055 deviation in mathematics and 0.0043 standard deviation in reading. In the 6th and 7th grader showed that the size of class is not correlated with the achievement of students. This approach has also been used to measure the effect of decreasing the size of class in California, with the effect of 0.006 – 0.01 standard deviation for reading and mathematics in the 3rd grades.
Other research express that smaller classes are more effective on the cognitive results, affection and learning process, this case is stated by Mery Lee Smith and Gene V Glass (1980), these relationships have not in the past been apparent because of an inability to deal with either the class sizes or the effects precisely and quantitatively. Using meta-analysis permits us to unravel the complexity and reveal the small but consistent effects of class size.

If there any quality problems on teachers and quality process has been qualified, then smaller classes are more effective on the results either in cognitive, affection, or learning process.

Discussion about study groups are more challenging in developing countries such as Indonesia, countries that geographically have islands and undistributed amount of citizens have more variations of the amount of study groups per island.

School education resources in private schools depends on the student funds. If the economy rate of the student’s parents aren’t enough to support school’s activities than the school itself are more likely to not develop.

This case is supported by a research from Havva Sebile Savasci & Ekber Tomul (2013), considering the educational resources of the school, a large amount of the school incomes is obtained by the student fees or the family contributions. In terms of the settlement, the educational resources of the schools were obtained by the student fees or the contributions of the families in city centers, town centers and villages, as well. Thus, it can be suggested that the educational resources of the schools are directly related to the socioeconomic situation of the families, and the higher socioeconomic level students have, the more facilities their schools obtain.

Quadrant of the Amount of Students per rombel 20 – 36 and the Amount of Rombel < 3. Same thing between the amount of students per rombel in 20 – 36 and the amount of rombel < 3 with the result of IPA’s and IPS’ UNBK Result are not significant. Doesn’t mean the amount of rombel < 3 with the amount of students qualified with the standard guaranteed will get higher UNBK scores. Schools that are in this quadrant, contains of 3 public high school and 12 private high school. The result of UNBK score in those schools for the science studies (IPA) are below 55.

Quadrant of the Amount of Students Per Rombel > 36 with the Amount of Rombel < 3, and quadrant of the Amount of Students Per Rombel < 20 with the Amount of Rombels > 36. There are no schools with the criteria above.

Quadrant of the amount of students per rombel > 36 with the amount of rombel 3 – 36. There are 416 schools with the criteria above. Correlation between the amount of 3 – 36 rombels and the amount of students per rombel > 36 with the result of IPA’s and IPS’ UNBK are correlated significantly with the correlation value r= -0.171 for IPA and r= -0.193 for IPS. In conclusion schools with the amount of students per rombel 36 and the amount of rombel qualified with the standard have negative relations with the result regarding the national exam. UNBK scores are not always good in conditions of quadrant like this. Some schools that have the amount of 3 rombels and students per rombel increased above 36 are most likely to be more efficient. Most of the school are schools that have only active for 3 three years or if the amount of students are divided by 2 parallel classes are too small. The average of UNBK scores are not as high as schools with more parallel classes like most schools that are mostly chosen by the society.

In classes that have more students can caused noise issues if the students cannot be controlled. Based on the research of Yusuf and friends (2016), found out that too much noise is the most common behaviour that are related to big classes. It is not by surprise that attention or concentration are disturbed in big classes whereas noise issues are common problem. These are the facts that were proposed by finn and achilles (1999) in Yusuf and friends (2016), that smaller classes enhance learning behaviour and produce less class interruption and discipline issues. Size of the class affect the student’s study behaviour, these common behaviour in middle school in Abeokuta, Ogun, Nigeria. These have a very significant impact on the variety of students behaviour regarding their studies. This affects student’s attention the most, being on time, motivation, and participation but not on the high participation, and inquired level.

Quadrant of the Amount of 20 - 36 Students per Rombel with the Amount of 3 – 36 Rombel with (Required Standard). Correlation between the amount of rombel and the amount of the students per rombel are according to standard have significant correlation with the result of IPA’s
and IPS’ UNBK result. Schools that have reach standards of national education that has the most value of $n = 8426$ for IPA guarding the quality and keep the effort to always fulfil the requirement standards that’s available also to reach the maximum UNBK results. The average scores for IPA’s UNBK is 50 and it’s classified as mediocre rather than the result of other UNBK’s Quadrants. Doesn’t meant the amount of student per rombel and the amount of rombel that is required with the standard has a strong correlation with the result of UNBK.

Based on In-Soo Shin dan Jae Young Chung’s (2009) research the effects of smaller classes on student achievement decreases as grade level increases. CSR effect on achievement is better in the early stage of studentship, especially in grades K-3. Therefore, policy makers should focus on this critical time period. If they have limited educational funds, elementary school students would be a better investment.

Quadrant of the Amount of Students per Rombel < 20 with the Amount of 3 -36 Rombel. School with the amount of Rombel qualified with the standard and the amount of students per rombel < 20 have a significant correlation. The correlation score is negative that shows not all of schools that have maximum UNBK score in this quadrant. When the amount of rombels are only 3 with the amount of 20 students per rombel can happen to the schools that has only been active for 3 years or schools that only have 20 students per class. UNBK scores in this quadrant are mostly about 50 or below 50 for both IPA and IPS.

Other than that, the correlation between the amount of 20 – 36 students per rombel and the amount of rombel > 36 with IPA’s and IPS’ UNBK, also have a significant correlation. Even the amount of rombels surpassed the standard but the amount of students per rombel are qualified with the standard than the UNBK score can have better results. The correlation value in this quadrant is higher than the correlation value in other quadrants. Correlation value $r= 0.278$ for IPA and $r= 0.305$ for IPS the average score for IPA’s UNBK in this quadrant is 55, and 50 for IPS, is classified as better as the other quadrants.

If study groups (rombel) increases then it’s automatically need more teacher that has an effect with funds problem. Based on Chingos with teachers’ salaries making up a large share of the costs of education, substantial changes in average class size have a large impact on the education budget. It is therefore not surprising that when public budgets are under pressure, it is sometimes proposed to increase class size (2012).

It’s not shown that there is not significant between the amount of < 20 students and the amount of < 3 rombels with the result of UNBK. In conclusion, it’s not always schools with the less amount of students and the less amount of rombels guarantee a good result for UNBK. Schools in Indonesia, with this kind of criteria have more less interest in the society and the usually need more students. A recap review about these schools needed to be done to give guidance and development to such schools.

The amount of students per rombel and the amount of rombel that surpassed the standard have a negative correlation with the result of national exam. In conclusion, schools with this criteria, surpassed too much of the standards so it’s uncontrollable and that makes the national exams scores uncontrollable too.

The amount of students per rombel 36 with the amount of rombel above 36 have the average of highest UNBK score, 58.97 for IPA and 53 for IPS. Based on the analysis above, it can be conveyed that schools can add rombel > 36 but with the amount of controlled students that’s 20 -36 students.

Based on the research from Joseph Sunday Owoeye and Philias Olatunde Yara (2011), that there is no difference in the performance of students in rural and urban schools. The issue of class size has been addressed in some states of Nigeria like in Oyo state who made an educational policy that the maximum number of students in a class should be 20. It is therefore recommended that our educational policy makers should formulate policies that will ensure that the number of students in a class should not exceed 30 students.

Other than that, does not mean the amount of few students < 20 can guarantee a good UNBK score. Teacher’s ability in teaching can be the main event besides the supporting learning facilities including a decent classroom.
The correlation between the amount of students per rombel with the result of Bahasa’s UNBK score have a significant correlation with the amount of 20 – 30 students per rombel and the amount of rombel qualified to the standard. The Bahasa department are usually lesser than other because not all schools provide it. Some schools that have a Bahasa department usually have limited amount of students so it can be controlled based on standard.

2.3 Optimal Point of the Amount of Rombel Per School and the Amount of Student Per Rombel

2.3.1. Optimal Point of the Amount of Rombel Per School

To see an optimal point of UNBK score in the amount of some rombels can be seen in graphic 1

Graphic 1 Optimal Point of the Amount of Rombel Per School in the IPA, IPS and Bahasa

The highest UNBK score is on the amount of 33 rombels. That means the most optimal way of studying happens when the amount of rombels are 33 eventhough the maximum amount of rombels in a high school is 36.

2.3.2. Optimal Point of the Amount of Student Per Rombel

The highest UNBK score is at the total of 36 students per rombel in all IPA, IPS and Bahasa Department. That means the optimal way of studying happens in a situation where there are 36 students per rombel appropriate with the process standard policy

Graphic 2 Optimal Point of the Amount of Students Per Rombel in IPA, IPS and Bahasa Department
We find that lowering class size has a positive effect on mathematics and reading achievement, though the magnitude of the effect is small, particularly following 5th grade. The costs of class size reduction have not been well estimated, but they are likely to exceed the proportional increase in the number of teachers needed to staff the smaller classes. First, class size reduction almost certainly leads to more support expenditure, increased building requirements, and the like. (Hanushek (1999a), Jepsen and Rivkin (2002)) dalam Steven G. Rivkin, Eric A. Hanushek, And John F. Kain. Lowering a class size have an effect on more needed funds.

3. CONCLUSION

There are 9,565 schools (76.14%) with the amount of rombel qualified with the standard (3 -36) and the amount of students per rombel are not qualified with the standard, that is not more than 36. Is qualified the standard, reaching

Correlation between the amount of 20 -36 students per rombel > 36 with UNBK in IPA and IPS department, have a significant correlation.

Based on research, school can add the amount of rombel more than qualified standard but paying attention to:

a. The amount of students per rombel cannot be more than 36
b. Have an UNBK score above the national’s average
c. Have the amount of teachers qualified with the amount of rombels with a qualification minimum of S1
d. Have enough class to provide the amount of rombels

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