

# Learning Innovation of Science Mathematics English Class in MI Muhammadiyah Program Khusus Kartasura

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**Abstract**—Science Mathematics English (SME) Class is a educational innovation which is founded in MI Muhammadiyah PK Kartasura. SME Class is designed for talented student in Science, Mathematics and English and it is one of the way to face competitive competition in globalization era to prepare talented students well prepared in their era. The objectives of the research was to identify the learning innovation of SME Class on elementary school level that is MI Muhammadiyah Program Khusus Kartasura in the aspect of preparation, implementation, and evaluation. This is descriptive qualitative research. The data was collected by observation, interview, and documentation. Observation conducted in learning process. Interview conducted by interviewing the teachers and head master. Documentation obtained by collection many documents supported on this research. The data validation is conducted by doing triangulation data, namely triangulation of sources and techniques. The result of this research, especially in Science, Mathematics, and English Subject, are: (1) the preparation begin by designing lesson plan using English and some others using bilingual, adding time allotment; (2) the implementation of the learning process is the usage of English to deliver the material, the usage of mini dictionary and bilingual books along the learning process, and also the usage of innovative strategy in learning process; (3) the evaluation is assessing three aspect of learning, that are: cognitive, affective, and psychomotor.

**Keywords**—educational innovation, learning, science mathematics english class.

## I. INTRODUCTION

Human development to a great extent depends on the improvement in education [1]. One of the ways that was carried out for the improvement is changing the curriculum. Curriculum was arranged to face the changing era. In the 21st century, Indonesia will have a demographic bonus, and the most recent one, Indonesia will reach Indonesia's Golden Generation. The golden generation should have 21st century skills' that are: generation who has good characters, critical thinking, creativity, innovation, communication, collaboration, and competition. So, Indonesian human resource have to master all that skill in order to be able to adapt in the changing era. This is in line with constitution of Republic of Indonesia, Law Number 20, 2003 about

national education, National education intend to strengthen student's potency, "National education functions to develop the capability, character, and civilization of the nation for enhancing its intellectual capacity, and is aimed at developing learners' potentials so that they become people imbued with human values who are faithful and pious to one and only God; who possess morals and noble character; who are healthy, knowledgeable, competent, creative, independent; and as citizens, are democratic and responsible."

The 21st century national education aims to fulfill the nation's aspirations, namely to make Indonesian people prosperous and contented, as well as have an honorable and equal position with other nations in global world. Those are to be fulfilled by society development consisted of high-quality human resources who are independent; as well as have willingness and capability to fulfill the nation's aspirations [12]. Education has an important role to actualize the development of students' potentials and capabilities. The 21st century capabilities have already been attached in learning process. To create future generation with good character, character building has also been integrated through learning. Besides that, literacy program has been starting to be integrated into schools' habituation culture. The character strengthening and school literacy programs can not only be conducted by school, but also by the cooperation of school, family, and society to fulfill the ambition of national education.

However, there are huge obstacles remain in the development of national education. As said by Irianto in Syarafuddin (2012), those are the aspects of improving education quality, equity, management, community participation, and accountability. The quality aspect is expected to not only meet national standard, but also international standard. Education has to be distributed equally throughout all society in Indonesia. In fact, educational inequality still persists between one region and the others.

Other than those problems, according to IEA in TIMSS study, Indonesia is still left behind in terms of the ability of its students in international scale. TIMSS 2015, [2] reported overall achievement as well as results according to four international benchmarks (advanced,

high, medium, and low), by major content domains (number, algebra, and geometry in mathematics, and earth science, biology, and chemistry in science), and by cognitive domains (knowing, applying, and reasoning). According to this report, in mathematics, it showed low performance of students in facing that test, on student in fourth grade. Indonesia's students got score 397 (6th place from the bottom), the highest score is Northern Ireland with 570 points, and the lowest score got by Kuwait with 353 points. In science, students of Indonesia's score is 397 (4th place from the bottom), the highest score is Singapore with a score 590 points and the lowest is Kuwait with a score 337 points. It shows that our achievement in Mathematics and Science is still low. It shows that our achievements in Mathematics and Science are still low. This result shows that Indonesian students participating in TIMSS study still have weak Mathematics and Science skills. A review conducted (Rahmawati, 2015) on the result of TIMSS study shows that Indonesian students could only solve routine problems, simple computation, and calculating science of facts in daily context. Indonesian students need to strengthen their ability in integrating information, drawing conclusion, and generalizing their knowledge to other things. It shows that the capability of Indonesian students participating in TIMSS study are limited to low order thinking. Moreover, in language aspect, TIMSS gave out problems in English, whereas Indonesian students' mother tongues are diverse. Thus, this has become challenge for educational stakeholders to give feedback on the result of TIMSS study.

School as a part of educational educator needs to create innovations to fulfill the demands of the changing era. Although the curriculum has already been assigned by central government, innovations still need to be done.

Innovations are ideas, practical things, methods, ways, man-made goods; which are observed or felt as new by an individual or a group of people (society); which are used to attain specific goals or to solve problems [5]. Thus, school as a learning executor have to create innovations in education. The innovation is a new change and qualitatively different from before, as well as intentionally exerted to increase the capability to attain specific goals in education [5]. Whereas, other opinion defines innovation education program as any pedagogical program or process of education for innovation capabilities and skills [7]. Educational innovations are needed to answer growing challenges, so that school need to be more responsive in confronting any forms of the changing era. The rapidly changing era needs to be balanced with an equally rapid change to synergize education by changing the good behavior of individuals, organizations, and society. This is in line with the statement that innovation education has been identified as a key contributor to enhancing the innovative behavior of individuals, organizations and economies [8].

Educational innovation involve many aspects like human resources, teaching method, finance and lost potential [6]. Lewrick et al, (2010) stated that

educational innovation programs involve personal, technical and organizational qualities; designed to empower both innovators and non-innovators with the tool necessary to undertake innovative activities. Another opinion stated by Sa'ud (2010) is that educational innovation is influenced by learning activity, internal and external factor, and the education system itself. Maritz, et al (2014) stated that components of innovation education program consist of: context, outcomes, objectives, audience, content, pedagogy and assessment. Educational innovation also depends on what teachers think, feel and do (Schreerens, 2010). Thus, to implement innovation in educational realm. Especially at school, it is necessary to consider the objectives, school resources, innovation contents, learning methods, cost, and human resources involved in the process.

Educational innovation is directly or indirectly aimed at improving the academic performance of students [10]. At many schools, there is continual improvement of educational practices and students' results, but there are also many schools at which educational innovations are not implemented successfully [10]. Thus, it needs to be realized that there are some obstacles remains so that the educational innovation could not be implemented optimally.

There are several models of educational innovations that can be implemented according to Miles in Sa'ud (2010), i.e: guidance and number of personnel; physical facility; time allotment; objective formulation; procedure; role needed; insight and feeling; work mechanism; strategy, etc. Number of students per teacher is generally associated with class size and it is mainly believed that smaller classes provide a better teaching and learning (Koc and Celik, 2015). In addition, innovation in educational realm is as follows: developed learning activity, the objectives of learning that has developed, development of learning media, and changing learning system.

One of the innovations implemented at MIM PK Kartasura to answer several challenges is creating class program to strengthen students' skills in Science, Mathematics, and English. This is important because Science is expected to be students' mode to learn about themselves and environment around them, as well as further development prospect in its implementation in daily life since it is needed to fulfill human needs through identifiable problem solving (Permendiknas No. 22, 2006). Mathematics is a universal science that serves as a basis of modern technology development. It has an important role in various disciplines and developing human intelligence (Permendiknas No. 22, 2006) that needs to be obtained since elementary education. Meanwhile, English is an international language that is better to be introduced since elementary education to get used and be trained. Considering the importance of those three Subjects in elementary school, MI Muhammadiyah Surakarta has implemented the innovation by opening SME class program.

Therefore, researcher was interested to conduct a study to identify the learning innovation of Science, Mathematics, and English (SME) Class on elementary school level that is MI Muhammadiyah Program Khusus Kartasura in the aspect of preparation, implementation, and evaluation.

## II. METHOD

This is descriptive qualitative research. This research conducted in MI Muhammadiyah PK Kartasura on Slamet Riyadi Street, Number 80 Kartasura on January until September 2018 on Science Mathematics and English Class. The researcher is also being the instrument of this research who collecting data by many techniques.

The data was collected by observation, interview, and documentation. Observation is collecting data in the research location (Creswell, 2015). The observation conducted in the learning process of SME Class, especially in the subjects of Science, Mathematics, and English. Interview conducted by making open-ended questions, and the interview conducted by interviewing the teachers and head master. Documentation obtained by collecting many documents supported on this research, such as: syllabus; lesson plan; book, and the others. The data validation is conducted by doing triangulation data, namely triangulation of sources and techniques. The data was analyses by using interactive technique using Miles and Huberman, that are: data collection; data reduction; data display; and verification.

## III. RESULT AND DISCUSSION

### The School's Profile

The school name is MI Muhammadiyah Kartasura established in 1970, the additional "PK" or Program Khusus is given later in 2008. This is one of favorite school in Sukoharjo and Surakarta because this school offers many favorite program that is needed by student in this era. In the academic year of 2107/2018 the students reach 509 with 55 teachers and staff. MI Muhammadiyah PK Kartasura has an intention that is creating person who love science, creative, mastering fundamental skill, has large knowledge, self-confidence, communicative, has good social empathy, love environment, and also faithful and noble.

The main program of this school are full day school, SME class, and tahfidz. Besides that, there are 26 programs in MI Muhammadiyah PK Kartasura, such as: Alphazone, Catalyst Day, Experiment, International Student Exchange, Outing Class, Kids Market, Quality Time, National Seminar, Teacher Study Program, Reciting Qur'an and Iqro' Graduation, Special Program for Sixth Grade, Morning Greetings, Listening Qur'an, National Song, Religion Song, Children Song, etc.

### SME Class Program

One of favorite programs in MI Muhammadiyah PK Kartasura is Science Mathematic and English (SME) Class. SME Class has just already established in the academic year of 2017/2018. SME class is a program

which is especially designed for students who has a talent on science, mathematics, and English. This is good program because it can be a solution to face international study of Trend in International Mathematics and Science Study (TIMSS) which is conducted every four years. TIMSS is international study which measures students' ability on science and mathematics [2] so the development of this class is urgently needed. The TIMSS' objective is to know how curriculum designed by every country implemented and how far the students' achievement on mathematics and science. This study is followed by Indonesia since 1999 with eighth grade as the population target but in 2015 Indonesia start using fourth grade as a target population. So, by the implementation of SME Class is a very good and interesting breakthrough for school in order to prepare students who are ready to compete internationally. This is in line with BSNP (2010) that aims to fulfill nation's aspirations, namely to make Indonesian people prosperous and contented, as well as have an honorable and equal position with other nations in the global world. Those are to be fulfilled by society development consisted of high-quality human resources who are independent; as well as have willingness and capability to fulfill the nation's aspirations.

By opening the SME Class, MIM PK Kartasura has actualized a school program that consider the changing era to develop and facilitate students to increase their capabilities. That is in lined with Rikkering, et al., (2015), educational innovation is directly or indirectly aimed at improving the academic performance of students.

The curriculum used in this class is the same with curriculum determined by government, so there is just a few differences between SME Class and the other. The differences can be seen on the amount of students, the time allotment, and also the learning process.

### The amount of student

Educational innovation can be done by changing the amount of the personnel [5]. Likewise, it is also implemented in SME Class. SME Class consists of twenty students, whereas the other first and second grade classes have more than 28 students per class. Number of students per teacher is generally associated with class size and it is mainly believed that smaller classes provide a better teaching and learning Koc and Celik (2015). Thus, the fewer the students are, the learning process is expected to get better.

The students derived from those enrolled at MI Muhammadiyah PK Kartasura. They are offered some programs developed in the institution. After they are accepted, they are given freedom to choose SME Class or not. If they are interested to join, they have to take exams. After completing the exams, they need to wait for the results. The exam questions are standard Mathematics logic for elementary students. This is in line with the UUSPN No.2 year 2003 concerning education for gifted children, that said "citizen who

possesses an extraordinary ability and intelligence deserves special attention.”

**Time Allotment**

Another innovation implemented in SME Class is time allotment [5] adjusted with the class characteristic. Since it focuses on Science, Mathematics, and English subjects, the time allocation for these subject is longer than other class. The time allotment in science, mathematics, and English subject is more than other class as shown in table 1.

**Table 1.** Time Allotment Difference between SME and General Class.

Subject	SME Class		General Class	
	1 <sup>st</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	2 <sup>nd</sup> Grade
Al-qur'an	1	2	2	2
Aqidah akhlak	1	2	2	2
Fiqih	1	2	2	2
Thematic	18	-	18	-
Mathematics	2	6	-	6
Science	2	2	-	2
English	4	6	2	2

Based on the table above, we can conclude that in first grade, besides thematic the students have been introduced on Science, Mathematics, and English which are stand alone as a subject. Teacher who teaches in this class is selected teacher who capable on English because the learning process will deliver using English. And for the second grade, the time allotment in Science and English is more than general class. By this term of time allocation, it is hoped that longer time allocation provide a better achievement of students.

**SME Class' Learning Process on Science, Mathematics and English**

Educational innovation involve many aspects like human resources, teaching method, finance and lost potential [6]. So, the teacher as a human resource is elected who capable in English and other capability. The teacher is involved in workshop and seminars to improve their capability. They are also trained by Cambridge Curriculum to learn about international curriculum and its content. Educational innovation that can used in procedure aspect, such as: using new curriculum; making lesson plan; etc (Miles on Sa'ud, 2010).

**Preparation**

Lesson plan arranged for Science, Mathematics, and English in SME Class is not much different with that in regular class, However, there are some materials compiled in English and refers to Cambridge curriculum. The language selection is adjusted with elementary students' ability so that they can understand easily. SME Class uses bilingual Science and Mathematics books that provide learning materials in two languages. This kind of books will help students in learning words and sentences

in English more easily. For every word that is hard to understand by a first grade student, teacher need to make a mini dictionary as a guidance in understanding English word.

**Implementation**

Educational innovation also depends on what teachers think, feel and do (Schreerens, 2010). Teachers have roles in managing all learning activities so that they will influence the innovation during classes. In an SME Class, a teacher plays a role as class leader that has an authority to manage class. However, he/she still has to consider the students' needs and conditions in implementing lessons. A teacher teach by observing students' needs so that they can learn happily while understanding the materials well. During classes, a teacher can give ice breaking, game, or song for students so that they will not get bored easily.

The learning implementation of Science, Mathematics, and English in SME class is not much different as that in regular class. However, there are some materials compiled in English. The language selection is adjusted with elementary students' ability so that they can understand easily. SME Class uses bilingual Science books that provide learning materials in two languages. This kind of books will help students in learning words and sentences in English more easily. For every word that is hard to understand by a first grade student, teacher need to make a mini dictionary as a guidance in understanding English word. The medium is adjusted with students' development phase.

During classes, teacher will give the students opportunity to study by observing what they like and associate them with the learning materials. For example, learning is conducted by playing games. Each student needs to participate and is given responsibility. In the process, students' roles in learning are emphasized. It means that they are given opportunities to construct their own knowledge by creating ideas in their minds, while teacher will only play a role as a mediator to help them constructing their ideas. Scientific learning activities will associate the learned concept with real life, so that there will be a big opportunity to give a more meaningful learning process. The students will also be able to construct their own knowledge through active learning process in accordance with their initial knowledge.

The focus of learning process is not just in cognitive aspect. This is in accordance with the objectives of national education to develop students' potential, which consists of affective, cognitive, and psychomotor. SME class students have higher cognitive targets than other in regular classes. So, in order to achieve the target, the time allotment in SME class is more than in regular class. Nevertheless, besides achieving abilities and talents in cognitive aspects, teachers also pay attention to students' needs in affective and psychomotor aspects. Teacher attempts to improve skill though assignment given to the students. Teacher also integrated characters building along the learning process, such as: responsibility, discipline,

independence, honesty, and others. The character was developed by the teacher especially in terms of doing assignments. This is in line with our government program through Perpres No. 87, 2017 to integrate characters building in learning process to strengthen and get used to characters value in students' behave along the learning process in order to face their own future.

Another educational innovation in SME Class Program to support students' talents are: (1) Holding reading program in the end of learning process; (2) Holding writing program in the end of learning process; and (3) Using English to deliver the material in learning process. The implementation of these programs are designed and carried out to the students by the teacher in SME Class. It intends to the students of SME Class can achieve their target as well as they hope. These program are conducted in order to minimize amount of students who haven't been able to read and write perfectly. The innovation is in line with Sa'ud (2010) that innovation is an idea, practical thing, method, ways, artificial goods, which is observed or felt as something new by someone or society which is used to reach certain goals or to solve problems.

Innovation is begun from some problems occurs in education field. Even though most students in the SME class have been fluent in reading and writing, the implementation of these program is still carried out to provide opportunities for a small number of students who have not read and written fluently without any presumption of being distinguished from other students. Thus students who have been able to read and write fluently can still explore and develop their abilities.

#### Evaluation

Assessment is conducted for assessing students' capability of cognitive, affective, and psychomotor aspects. The cognitive aspect which is carried out in SME Class is different from regular class. In paper and pencil technique, the questions of SME Class consist of 80 percent is written in Indonesian and the last 20 percent is written in English but in regular class, all the question is written in Indonesian. Test conducted in daily examination, middle examination, and final examination. In regular class, sometimes teacher read the question paper to make student easily understand the question, but it didn't for SME Class.

The assessment of affective aspect is carried out through assessing students' behavior along the learning process, such as: cooperative; discipline; responsibility; self-confidence; etc. For the psychomotor aspect, teacher assesses students along the learning process through many techniques, such as: performance assessment and product assessment towards the assignment given.

The evaluation of SME Class program has not been significantly conducted. For the last two years, the evaluation is limited to knowing the program continuity from regular coordination meeting among teachers, head master, and the chairman of Muhammadiyah foundation. Nevertheless, school continuously improved these parts of SME Class to make it better and better.

#### IV. CONCLUSION

The result of this research, especially in Science, Mathematics, and English Subject, are: (1) the preparation begin by designing lesson plan using English and some others using bilingual, adding time allotment; (2) the implementation of the learning process is the usage of English to deliver the material, the usage of mini dictionary and bilingual books along the learning process, and also the usage of innovative strategy in learning process; (3) the evaluation is assessing three aspect of learning, that are: cognitive, affective, and psychomotor.

#### REFERENCES

- [1] Haseena V.A., & Ajims P. Mohammed. (2015). Aspects of Quality in Education for the Improvement of Educational Scenario. *Journal of Education and Practice*. Vol.6, No.4, 2015, 100-105.
- [2] IEA. 2015. Trends in International Mathematics and Science Study 2015. available from <https://www.iea.nl/timss-2015> (accessed 2 October 2018).
- [3] Rahmawati. (2016). Hasil TIMSS 2015. available from <https://puspendik.kemdikbud.go.id/seminar/upload/Hasil%20Seminar%20Puspendik%202016/Rahmawati-Seminar%20Hasil%20TIMSS%202015.pdf>. (accessed 8 October 2018)
- [4] Zubaidah, Siti. (2016). Keterampilan Abad 21: Keterampilan yang Diajarkan Melalui Pembelajaran.
- [5] Sa'ud Udin Syaefudin. (2010). Inovasi Pendidikan. Riduwan (eds). Penerbit Alfabeta: Bandung.
- [6] Shen, Yanzia. (2008). The Effect of Changes and Innovation on Educational Improvement. *International Education Studies*. Vol1, No. 3, 73-77. can be access on: <https://files.eric.ed.gov/fulltext/EJ1065412.pdf>.
- [7] Lewrick, M., Omar, M., Raeside, R. and Sailer, K. (2011), "Education for entrepreneurship and innovation: management capabilities for sustainable growth and success", *World Journal of Entrepreneurship, Management and Sustainable Development*, Vol. 6 No. 1, pp. 1-18.
- [8] Maritz, A, et al., (2014). Innovation Education Programs: toward a conceptual framework. *European Journal of Innovation Management*, VOL. 17 No. 2, 2014. DOI 10.1108/EJIM-06-2013-0051, pp 166-182.
- [9] Peraturan Presiden Republik Indonesia Nomor 87 Tahun 2017 tentang Penguatan Pendidikan Karakter, diakses melalui: [http://setkab.go.id/wp-content/uploads/2017/09/Perpres\\_Nomor\\_87\\_Tahun\\_2017.pdf](http://setkab.go.id/wp-content/uploads/2017/09/Perpres_Nomor_87_Tahun_2017.pdf).
- [10] Rikkerink et al., (2015). A New Model of Educational Innovation: Exploring the Nexus of Organizational Learning, Distributed Leadership, and Digital Technologies. *J. Educ Change*. DOI:10.1007/s10833-015-9253-5. Springer

- Publisher. <http://www.nso-cna.nl/wp-content/uploads/2016/08/Rikkerink-Verbeeten-Simons-Journal-of-Educational-Change-2015.pdf>. (accessed 1 November 2018).
- [11] Syafaruddin, dkk. 2012. *Inovasi Pendidikan (Suatu Analisis Terhadap Kebijakan Baru Pendidikan)*. Medan: Perdana Publishing. <http://repository.uinsu.ac.id/140/1/Inovasi%20Pendidikan.pdf> (accessed 1 November 2010)
- [12] BSNP. (2010). *Laporan BSNP Tahun 2010*. can be accessed on: <http://www.bsnp-indonesia.org/id/wp-content/uploads/2012/04/Laporan-BSNP-2010.pdf> (accessed on 1 November 2010)
- [13] Koc dan Celik. (2015). The Impact of Number of Students per Teacher on Student Achievement. *Procedia - Social and Behavioral Sciences* 177 ( 2015 ) 65 – 70. Published by Elsevier, Available online at [www.sciencedirect.com](http://www.sciencedirect.com). (accessed on 1 November 2018).