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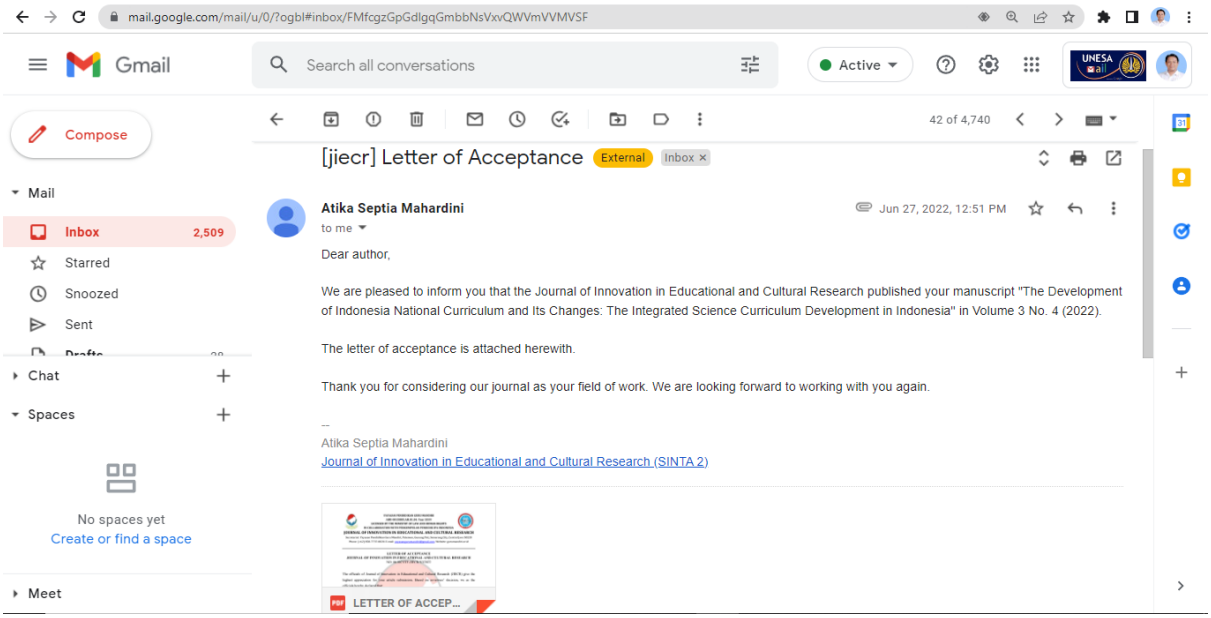

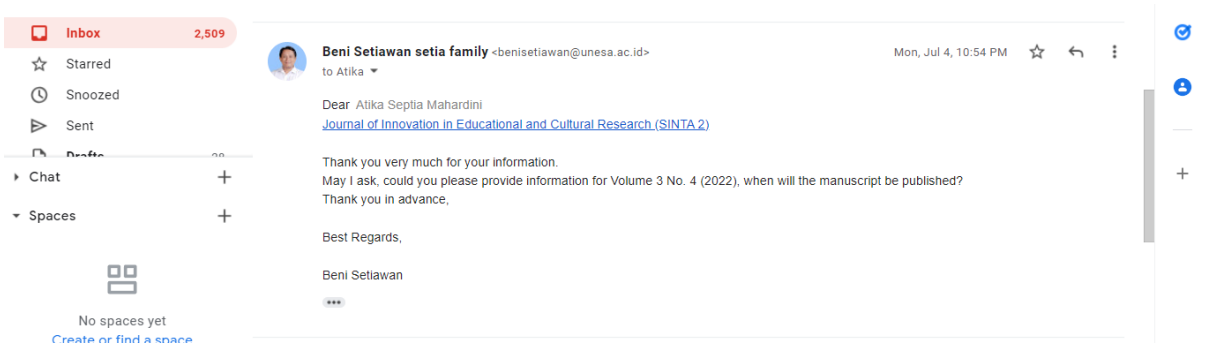
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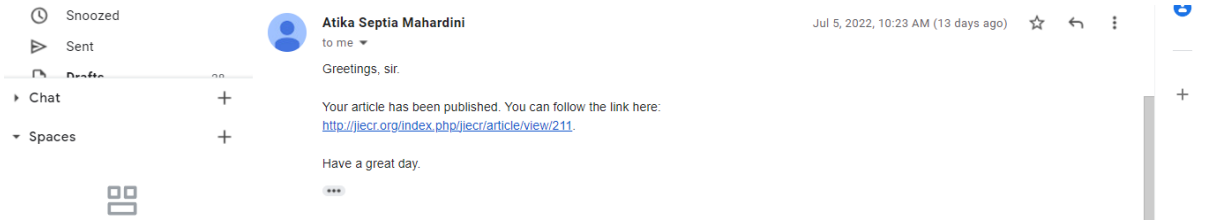
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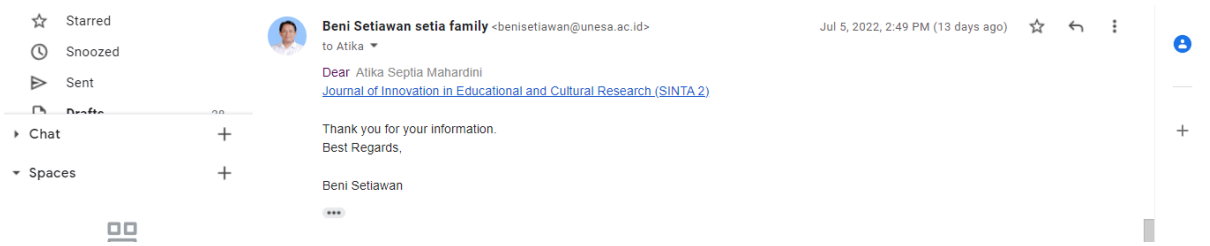
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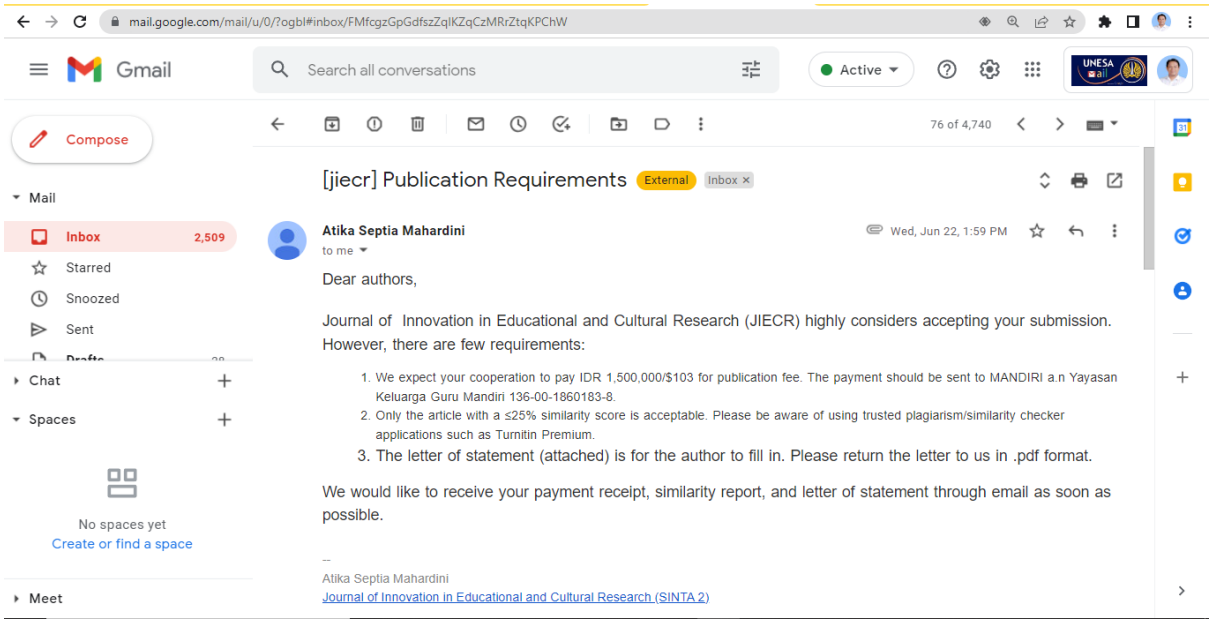
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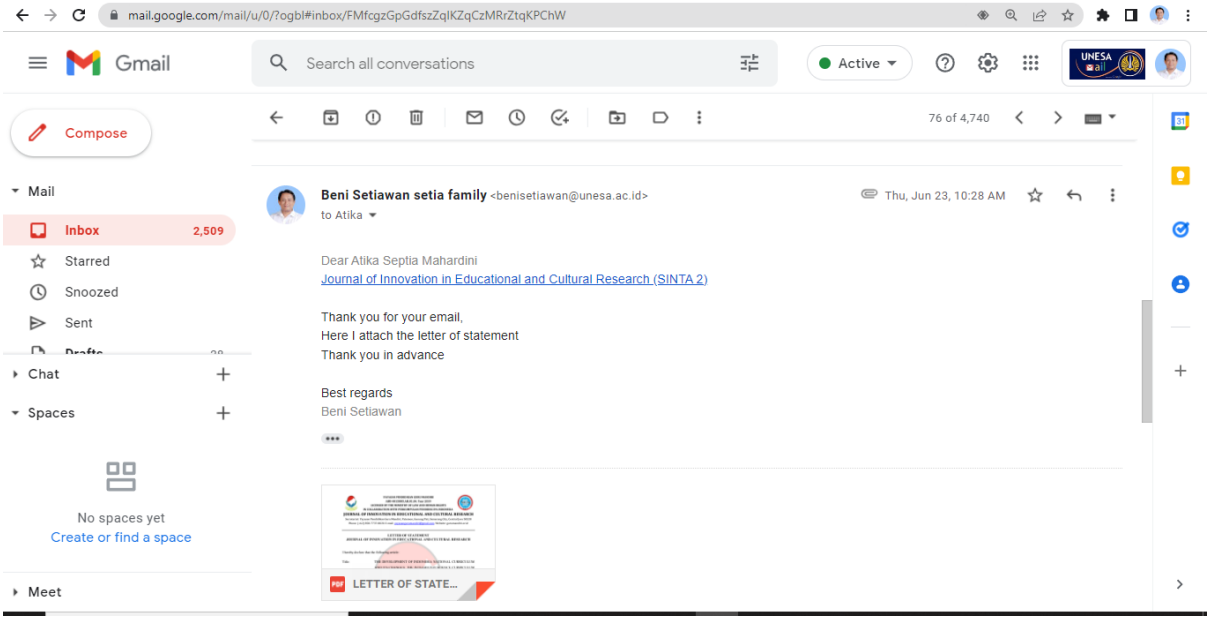
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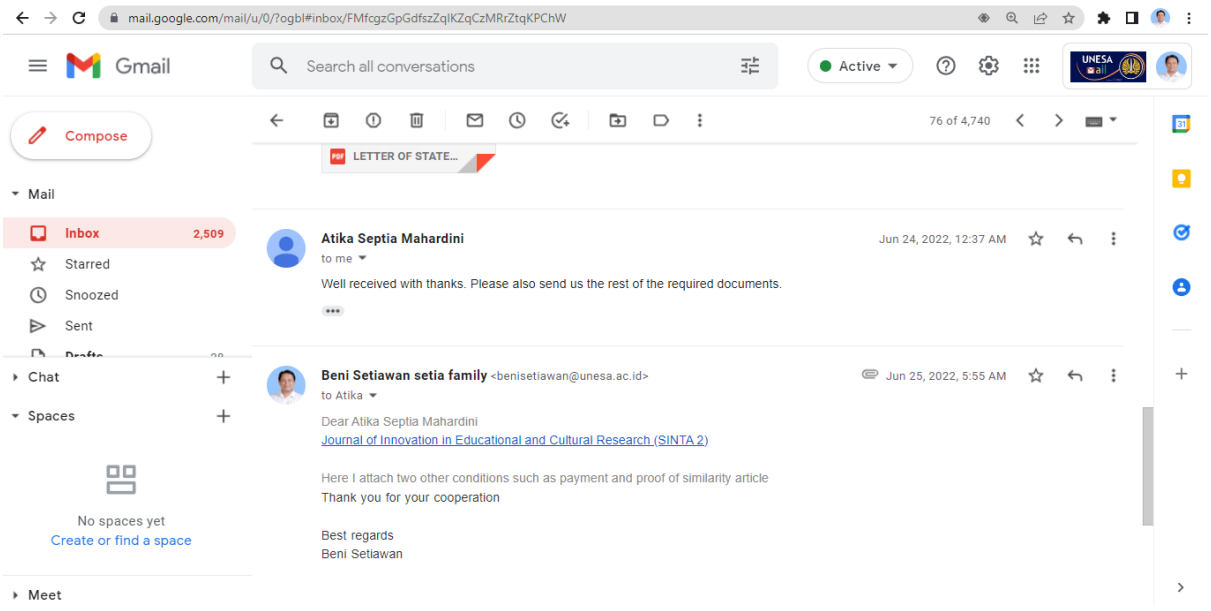
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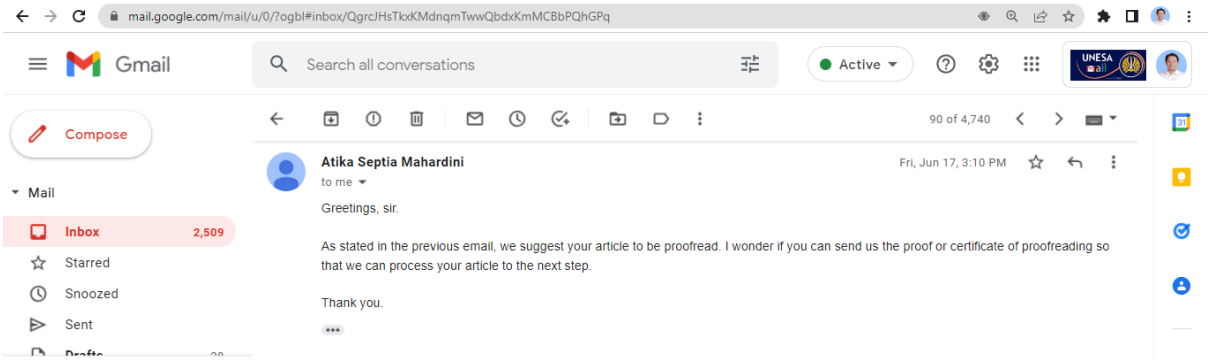
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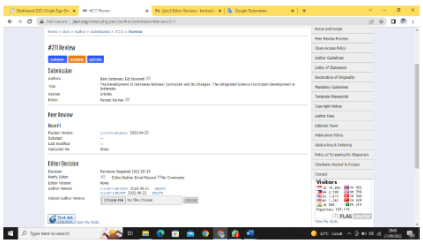

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Authors: Beni Setiawan

Edi Suwandi

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The Development of Indonesia National Curriculum and Its Changes: The Integrated Science Curriculum Development in Indonesia

***Beni Setiawan*[1*] *Edi Suwandi*[2]**

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Abstract:
The national curriculum of Indonesia had undergone change several times, more than ten times in precisely. Those alterations are logically consequences of science learn political issue, government system, social culture, economic, and science technology in the community. The aims of this article are to develop the integrated science in the science classroom. Qualitative research and document analysis as a method is using in this study research. The result of this qualitative research is the deeper analysis of history of science, science textbook development, and integrated curriculum for science learning. The history of science depict that the change of curriculum was impact on how science integration with another knowledge in curriculum. In the last curriculum, the teaching science in junior high school is Integrative science and different from integrated science. Regarding to textbook development, the Indonesian government has two main mechanisms for providing textbooks to support curriculum implementation, namely the government development and a non-government publishing company can develop a textbook using national standards. The last finding is the integrated curriculum for science learning, there is a relationship between the philosophy of science, integrated science, and science education. This research may have contribution to science especially science education with a term of integrated science model called *Biology-Physics-Chemistry and other disciplines-Philosophy (BPCO_P)*

Keywords: BPCO_P, Curriculum, integrated science, science education.

INTRODUCTION

Indonesia has five fundamental ideologies such as belief in one god, humanitarianism, national unity, consensual democracy, and social justice. Thus, five essential principles called *Pancasila*, *Panca* is five and *Sila* is the norm or the ideology of Indonesia people. The Pancasila become the guideline for the citizen to hold their social interaction (Weatherbee, 1985)

During the 1500–1600s, Indonesia became a center of trading among merchants from countries in the Middle East, Europe, and India. In addition, during that time, there was no national educational system program, however, the religious school based on Hindu, Buddhist, and Islamic religion was provided and the religious organization is responsible for that school, including Christian missionaries and Muslim religious schools. In particular for Islamic education was not touch by the colonialism which emphasize on the capability of writing, accounting, and reading in Melayu language because that language becomes the language which use in daily life of trading (Supriadi, 2003).

A long before arrived the Dutch in Indonesia, there are a few Chinese people who come to Indonesia and married with the native people. In Indonesia, Chinese people are divided into two types such as Totok and Peranakan Chinese (Suryadinata, 1972). The Totok Chinese people is the Chinese people who they have the pure blood or original from mainland China. There are two ethnically of those people such as Hakka and Cantonese. On the other hand, the Peranakan Chinese is the Chinese people who mix blood with the native people. It means that the Peranakan china was married with local people and stay for next generation in Indonesia and there ethnically is Hokkien.

Based on the education, the Totok and Peranakan China has different treatment. The children from Peranakan China did not much pay attention with education because mostly they were born in 1880s. During that time, in twentieth century, the school was rarely, even though it was existing, only is kind of informal school based on the Confucianism paradigm. Since three Dutch missionaries such as Albers, Coolsma, and van der Linden were come to Indonesia, the educational system already starting to look faint, particularly for the school. Those Dutch missionaries set up the exclusive school which teach Malay language, writing, arithmetic, drawing, and advance class Dutch. Furthermore, in 1908, the first Dutch primary school for the Chinese, the Hollandsch_Chineseesch School (HCS), was established in Batavia, which is duplicated later in other major cities. In further, the school is separating between the Dutch school and the oldest Chinese school in Djakarta called Tiong Hoa Hwee Koan (THHK) School. The students who failed to register in the Dutch school, they would be enrol into the Chinese school. Moreover, the population of those school since 1915 into 1926 can be described table 1.

Table 1. The Population Chinese and Dutch Medium School

Year	Chinese Medium School	Dutch Medium School
1915	16.499	8.060
1920	14.242	13.617
1925	29.401	19.382
1926	32.668	27.802

Suryadinata, 1972

During the Japan colonialism in 1942-1945, the western and the Dutch school oriented were banned, while the Indonesian and the Chinese medium schools were permitted to operate. This regulation was starting August 1, 1942. The Japanese government threated Totok and Peranakan Chinese with the same level in education. The Peranakan Chinese were also encouraged to study Chinese, including students in HCS also receiving their education in Chinese-medium schools.

In the late sixteenth century the Dutch East India Company forcibly colonized Indonesia and took control of its land and resources. The trading company came to be administered by the Dutch government in 1800. By 1819, the territory became an official colony of the Netherlands called the Dutch East Indies. Furthermore, the Dutch government introduced limited public and private schooling reserved solely for the Dutch and other Europeans.

During the colonial era and the beginning of 20^{th} era, the educational system has been recognized the classification with tiered from elementary school until university levels. Through 1942, in the elementary school level, the educational system divided into several level with different curriculum, facilitation, and teachers. Regarding the educational system in elementary school level, there are three categories of students who study in colonial era, such as local students, local students with high status, and students from China and European descendants. In term of local students, in the elementary school level, they have two grades of class, such as grade four and grade five. Those

grades were a continuity of village school (*Volkshool*) with Melayu language and Latin script. In addition, some schools (*pribumi*) provided 2 or 3 years of training in basic literacy and math. On the other hand, HIS elementary school (*Hollandsche Inlandsche School*) has provided for local students who from high social status with seven years longer and taught in Dutch language. The ELS (*Europesche Lagere School*) is the school intended for elementary students from Dutch and European offspring. In addition, only a few students from local (*pribumi*) with high status are entering into ELS school. The different schools for different students' background also happen in junior and senior high school. MULO (*Meer Uitgebreid Lager Onderwijs*) in junior high school and AMS (*Algemeine Midle School*) for senior high school are intended to local (*pribumi*) students. In one hand, HBS (*Hogere Burger School*) is the school which continuation of ELS school for students from Dutch and European. But, in Japan colonial, the educational system based on the social strata was erase and since independent era, the government determine the one of educational system called *sekolah rakyat* (*SR*) or lower school SMP/SGB/ST, SMA/SMK/teacher's school. In addition, since 1968 until 1975, the same government which responsible in educational system.

After three month of Pearl Harbor tragedy, the Japanese compelled the Netherland indies to surrender and it was happened on March 9, 1942, closed nearly continuous 350-year period of Dutch ascendancy in Southeast Asia country, especially Indonesia. Moreover, it was opened the Japanese era for three and one a half year. Some of Indonesian peoples who want to escape from Dutch colonial, welcomed the Japanese invasion. During their occupation of Indonesia, the Japanese introduced the first system of mass education, which opened schools for all students and supported the use of local languages for instruction (Bangay, 2005). However, similar to the Dutch colonial schools, education in these schools were designed to support the needs of Japan as an occupying power rather than promote the educational development of native Indonesians. The Japanese remained present until the end of the war in 1945. Unfortunately, there is no detail instruction how Japanese government in managing schools in their colonial era, particularly in Indonesia (Thomas, 1966). However, there is no instruction during the Japanese colonialism and the Japanese school is not spready in each island but the Japanese instruction is considerate have influence in almost all sectors of Indonesia island.

The Dutch curriculum was supporting the construction of pure science as the Dutch colonial project (Goss, 2009). Meanwhile, event three years and a half occupation, Japanese curriculum brought in some important educational policies which persist and still can be found today. The subject was also altered later, during 1942, the old curriculum contains *kagaku* (natural science) and it changed to *rika* (science) in the new curriculum at 1943 (Ramli, 2010). Thus, Dutch and Japanese were not accommodating science on the integrated ways, it is only focus on pure science. Furthermore, the national curriculum of Indonesia had undergone change several times, more than ten times in precisely, such as curriculum before colonial until after independence (Faisal&Martin, 2019). Those alterations are logically consequences of political issue, government system, social culture, economic, and science technology in the community (Soekisno, 2007; Brown & Beswick, 2014). The changing of curriculum also has impact on the essence of science as integration in school, particularly in elementary and junior high school (Faisal&Martin, 2019). Curriculum 2013 is accommodating the integrated science on curriculum and it implement science was taught by integrated in science classroom (Kemendikbud, 2013b; Rohmatulloh, 2019), but the meaning of "integration" and the value of integrated approach have not always been made explicit (Brown, 1977). Based on the analysis of previous research, the researcher tries to analysis the integrated science curriculum development in Indonesia, particularly in junior high school level.

METHODS

This study is the qualitative research with document analysis as a method (Gray, 2004). Document analysis is a form of qualitative research in which documents are interpreted by the researcher to give voice and meaning around an assessment topic (Bowen, 2009).

The instrument are some documents, which will analysis to explore the science in middle school level. Furthermore, there are three types of document, namely public record, personal document, and physical evidence. The record consists of the basic law of 1945, the Indonesian government law, and the curriculum documents since before Independence Day and after independence days of Indonesia, national textbook, strategic plan, and syllabus. Moreover, the previous article in journal as personal documents. Meanwhile, the training material and handbook are representing the physical document or artifacts (O'Leary, 2014).

Document analysis was a complementary data collection procedure in support of triangulation and theory building. Analysing documents incorporates coding content into themes similar to how focus group or interview transcripts are analysed. Document analysis involves skimming (superficial examination), reading (thorough examination), and interpretation (Bowen, 2009). In this research the data analysis used skimming, reading, and interpretation of several documents with involved the content analysis.

RESULT AND DISCUSSION

A. History of IPA/Science

The history of the majors and courses in Indonesia were influenced by the curriculum changing. The curriculum 1964 was offered the culture major for senior high school and *Prakarya* (handicraft) course in the curriculum. Furthermore, in curriculum 1968, the mathematics course emerged besides healthy education and inclusive education. On the other hand, the numeracy subjects were erased. Mathematics subject has a relationship with IPA/science because in the science subject requires the mathematics in the formula of physics, chemistry, or biology law (Bishop, 2008). For instance, the physician needs mathematics for a count the number of frequencies. In addition, during that time, curriculum 1947 to curriculum 1964, there are no institutions that analysed and discussed about the mathematics and science subjects because in that time government focused on civic and history education. In curriculum 1968, it changed to choose a major in senior high school. Moreover, there is no evidence or data about why that adjustment was happen. Furthermore, in the last of the sixth decade or 20 centuries, even though the curriculum was changing but the subject is the same such as botany, algebra, and history of the world (Soedijarto. et al., 2010).

In curriculum 1975, the government intended more to organize the curriculum based on the National Education standard, which one of the purposes in the development of science and technology. There was an institution from the government to handle the curriculum called Curriculum Center Organization (*Pusat Kurikulum*). Based on their research, the curriculum cantered developing the science major for students in senior high school and in 1984 the government divided the IPA majors to two parts such as the IPA for physic majors like chemistry and physics and biological subject called Program B. But, in the early 1990s, the both of IPA major such as physics and biology majors are deleted and replaced by IPA major in senior high school. After one decade, the IPA has Broad field into junior high school as an integrated science. Moreover, it sticked out until the curriculum 2013, which is integrated science in junior high school (Belen, 2007). For instance, the basic competencies "3.9. Recognizing the concept of static electricity, electrical potential, electrical conductors, electricity in the nervous system, electricity in the heart, electricity in the skeleton, and animals that contain electricity" (Year 8, Kemendikbud, 2013b, p. 52). This basic competency is integrative physics and biology subject.

However, the curriculum 2013 proposed three approaches to teaching IPA (science) at each level of schooling. In elementary school, science is to be taught as an integrated subject with Pancasila and Civics Education, Indonesian and Mathematics. In junior secondary school, IPA "is developed as the subject integrative science . . . not as the science disciplines" (Kemendikbud, 2013b, p. 2), and in senior secondary school, three are elective subjects and separated such as Biology, Physics and Chemistry subjects.

The interesting one is the teaching science in junior high school is Integrative science and different from integrated science. Those kinds of term are different. The term 'integrative' is unusual, particularly in the sense of integrative science rather than integrated science. Integrated science is generally used to imply that the content of the course comes from across the disciplines, as demonstrated above. Integrative science has been used elsewhere to imply the inclusion of social and cultural (including cross-cultural) aspects as well as scientific understandings. From this perspective, the whole curriculum 2013 may be considered as integrative because Core Competencies 1 and 2 throughout refer to the religious, social and cultural basis of education in Indonesia (Michie, 2017).

B. Science textbook development

A teacher's guidebook is published by Kemendikbud for each year of IPA in junior secondary. Each guidebook (Kemendikbud, 2014) serves two functions. The first function is about teaching, learning, and assessing IPA as well as Assessment of Core Competencies 1 and 2. The second function identifies science teaching strategies for each year level by using the student book.

Regarding the Ministry of Education and Culture Indonesia law number 8, 2016, there are two kinds of the textbook which utilize in schools such as textbook lesson and non-textbook lesson. The textbook lesson is the main of operational tools towards implementation curriculum and the non-textbook lesson is the supporting facilities to implement, evaluate, and to develop of lesson for students to cover the criteria which is available for education units or school. In addition, the textbook lesson is the main resource to acquire basic competencies and core competencies which is legally based on the Ministry of education and culture and can be used in education units. On the other hand, the non-textbook lesson is the enrichment textbook to support the learning process in each level of education.

The Indonesian government has two main mechanisms for providing textbooks to support curriculum implementation. First, the government may approve textbooks developed by various authors and adopt them for publication as national textbooks. Alternatively, a non-government publishing company can develop a textbook using national standards. For example, all science textbooks, published by either government or private entities, must include instructional activities focused on observation, simple experiments/demonstrations, and inquiry-based investigations designed to help teachers and students achieve both Basic and Main Competencies in the curriculum. There are seven non-governmental publishers (*Yudhistira Galia Indonesia, Tiga serangkai, Erlangga, Esis, Gramedia Widiasarana Indonesia, Intan Pariwara, and Yrama Widya*) that actively contribute to publishing more than 15 biology textbooks for each grade (Faisal&Martin, 2019). Moreover, since 2008, the Indonesian government provides an electronic textbook for all of the subjects, including the science textbooks in junior high school level. This textbook is free for all of the students by downloaded in the Ministry of education and culture website or provided by the school. In addition, the Indonesian government also provide two kinds of textbooks namely teachers' book and students' book. Based on the discussion with one of the science teachers in junior high school, mostly, the science teachers have utilized the formal textbook from the government, and very rarely science teachers use other textbooks from the private publisher to teach students in the classroom.

However, the textbooks generally share common features, such as structure and content arrangement, and as the authors all use the same criteria described by the MOEC for writing textbooks. The criteria require that textbooks compelled with generalized content structure and organization and offer learning and teaching activities within the text. In addition, the compulsory guidelines provide clear instructions about layout, preference, content, and closing part. Moreover, the government and a private company which publish the textbook lesson and non-textbook lesson should consist of the authors, editors, illustrators, reviewers, and publishers.

Thus, there is limited room for variation. In addition, the authors are required to represent diverse academic backgrounds and professions, such as science teachers, university content lecturers, teacher educators, and researchers (MOEC, 2016d). The textbooks are usually revised following the enactment of new educational standards in the national curriculum. The most recent textbooks have been designed to support teachers and students to achieve the 2013 national science competencies. Regarding the science textbook, the platform of science is biology because living things are used as objects to explain the basic principles in nature such as natural objects and their interactions, energy and balance, and so on. Through discussions using various fields of science in the natural science cluster, a complete understanding of the nature it inhabits along with natural objects encountered in its surroundings can be mastered by junior high school students (MOEC, 2014). In addition, textbooks often include illustrations, diagrams, and photographs to help students easily understand concepts and conduct experiments. For example, the overview of integrated science textbook for students in grade 8 which contain a lot of the activities instruction for students to acquire the basic competencies of science such as the biology activities on stimulant effects on closing motion and opening shy princess leaves, straight motion experiment in physics, and investigate dyes on foods that are safe for the body in chemistry. If teachers have laboratory materials and equipment available, students can follow the learning activities outlined in the textbook. However, if there are no supporting laboratory tools and materials, they can modify or make a different type of activity targeting the outlined subject competencies, or at least to identify the label of food sachet, which contains the artificial substances (MOEC, 2014).

Regarding the changing of the Indonesian curriculum which offers integrated IPA/science in junior high school level since early 2000. There are emerging questions on how to teach science subjects in junior high school by integration among science or other subjects. Moreover, to integrated science and other subjects, teachers should look back at the curriculum and try to analysis the concept which can or cannot integrate.

C. Integrated curriculum

The first question was arising is “what is the integrated curriculum”. This question can be explained by a simple word, the integration curriculum in making connections. The next questions are “what kind of connections”. Moreover, the definition of the integrated curriculum has been an issue of discussion since the turn of the 20th century (Hurd, 1986). The national council of teachers of English (NCTE) in 1935 has the definition of integrated science. The definition is the correlation may less attention to related materials in other subject areas, but it focused on the teachers make the materials of one subject and interpret the problems of topics to other subjects.

In general, there are ten (10) models to integrate curriculum namely fragmented, connected, nested, sequenced, shared, webbed, threaded, integrated, immersed, networked models (Fogarty, 1991). Based on those models, it can be divided into four big disciplines, such as single disciplines (fragmented, connected, nested), across several disciplines (sequenced, shared, webbed, threaded, integrated), the disciplines within learners (immersed), and across networks of learners (networked). However, it is not all of that models can be implemented in the integrated science especially for teaching science in junior high school.

Moreover, several models can implement at the faculty level to arrange the curriculum and the policymaker to construct the policy of curriculum in countries. Furthermore, there are three categories of integrated curriculum namely multidisciplinary integration, interdisciplinary integration, and transdisciplinary integration (Drake&Burns, 2014). Firstly, multidisciplinary integration focused on disciplines. It means that the integration is from different disciplines such as science, mathematics, history, English, arts, and design and technology. The concepts of this integration which are all of the discipline are bound to one big theme. Secondly, interdisciplinary integration is integrating across disciplines, for instance, the integration between science and social programs, such as to embrace science with history and geography. But this integration still uses theme as a glue towards each discipline. Besides the theme, literacy, thinking skills, numeracy, and research skills are the skills to placard among disciplines (Riper III, et al, 2011). The transdisciplinary integration is the integration of interdisciplinary and disciplinary in the real-life context. Moreover, the concepts of this integration are the negotiations with the students' questions and concerns. It means that integration is an integrated curriculum with students because the subject should be related to students' backgrounds (Brown, 2002). For example, the curricular program is a motion for junior high school student. In that context, students develop their own curriculum, teaching methods, and assessments around areas of interest to them.

Regarding the integrated curriculum, the Ministry of Education Indonesia by *Pusat Kurikulum (Puskur)* has the official document to adjust the integrated science in junior high school, called The Academic Education Curriculum Policy for IPA/Science Subject. The official documents are talking about two kinds of integrated curriculum approaches, namely intradisciplinary and interdisciplinary integration. Intradisciplinary integration is the integration among Biology, Physics, and Chemistry in the science programs. For instance, study about motion and change. The examples are learning around the concept of motion in physics and biology, such as motion in irregular straight motion in physics and motion of blood in the blood vessel which integrated with changing concepts in chemistry like chemistry changing and physical changing. On the other hand, interdisciplinary integration is integrating across disciplines (Drake&Burns, 2014), for example, the integration between science and health in the topic of "cigarette and healthy". That topic in the basic competencies for science students in the 8^{th} grade.

In term of the concept of integration, the integrated science is different with the integration in STEM concept. The U.S. National Science Foundation (NSF) is the institution which the first introduce the STEM education. Since then, it spread in other countries and become famous in several countries, including in Indonesia. The integration consists of science, technology, engineering, and mathematics. In STEM education, science is incorporate with the study of natural phenomena which is using observation and measurement to explain and answer the hypothesis in the around of environment. Science is the general term which comprising the Biology, Physics, Chemistry, and the space/astronomy sciences. Technology, on the other hand, connecting with the human innovations that can be used to help humans gain their needed in their life. Meanwhile, the engineering to address the need to gain and apply the science, knowledge, and economic to design and construct the machines or the tools which have advantages for human beings. The last is mathematics, which should provide to become basic of implementation science, technology, and engineering.

STEM education emphasizes the students to have competencies which appropriate with 21^{st} century. It means that the students are not enough only have the mathematics and scientific concept to become modern citizen but also need the related knowledge of these to engineering and technology. In addition, it encourages learners to have problem solving skills and critical thinking skills which related with STEM and solve the problem in their daily lives (Paul, 2008; Bybee, 2013; Chesky&Wolfmeyer, 2015). Furthermore, due to the STEM

education, students in primary and secondary levels should have 1) identify, explain, and draw the phenomena by gained the knowledge, attitude, and skills, 2) acquire the STEM discipline can enhance human knowledge, investigation, and design the skills, 3) enhance the materials, intellectual, and culture environment, and 4) proliferation the willingness to participate in solving the problem which related to cultural environment (Bybee, 2013).

Thus, the STEM is general integration among science, technology, engineering, and technology, while science including Biology, Physics, and chemistry are a part of STEM but integration science is not enough to face the challenges in globalization era. Learners need to have competencies such as problem solving, critical thinking, and creative thinking and try to blend it into STEM notion to deal with the 21st century.

Recently, the scientist often perceives that philosophy is totally different from science and cannot be combined with each other. However, philosophy has a contribution to science such as clarification of scientific concepts, the critical assessment of scientific assumptions or methods, the formulation of new concepts and theories, and the fostering of dialogue between different sciences, as well as between science and society. (Laplanea, 2019). Based on the analytic approach, there is a relevancy between the philosophy of science and science education. It is explained that the analytic philosophy of science can provide the major concepts and methods of science education (Martin, 1974). Besides, hypotheses and experiments can be used to integrate several disciplines in the science field (Bertalanffy, 1953). The proportion instructor reports the ratio of science consist of biology, thirty-nine percent; physics, thirty-five percent; chemistry, thirty-four percent. This confirms the other data that the burden of integrated science is borne by the specialist in the teachers (Webb & Reynolds, 1939). Furthermore, one of the first steps in mapping and developing integrated Science education was to find a model for integrated Science (Åström, 2008). There are several ways to organize integrated Science education, and one of the ways is 'Concepts in Science': this involves presenting general concepts in Science together with demonstrations of how different disciplines interact with these concepts. An example of this is the concept of Energy, which may be studied from the perspectives of Chemistry, Physics, and Biology at different school levels.

Based on the purposes of curriculum 2013 and several previous references talking about the integrated science concept. Obviously, there is a relationship between the philosophy of science, integrated science, and science education. For instance, the philosophy of the traded model is appropriate to model to deliver integrated science in junior high school and has core concepts with curriculum 2013. In addition, curriculum 2013 is focuses on how to improve the students' skills by achieving the basic competencies of each science subject. Moreover, the traded model is treading the thinking skills, social skills, study skills, graphics organizer, technology, and multiple intelligence approach to learning throughout all disciplines (Fogarty, 1991). The model of integrated science philosophy for junior high school can be seen in figure 3.

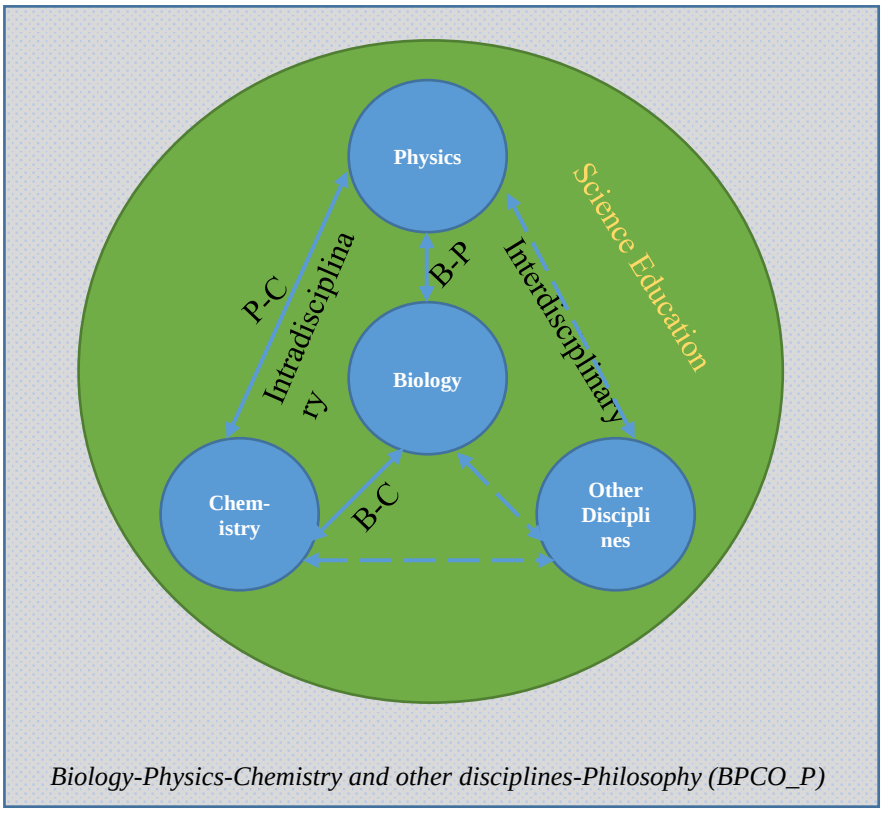

Figure 3. The BPCO_P Model of Integrated Science in Junior High School

CONCLUSION

The development of curriculum in Indonesia were often changing. This changing can be divided into two big groups, such as the curriculum development before and after independence period. Before independence, it was dominated by colonialism from Netherlands and Japan. Meanwhile, after independence, the development of curriculum was changing almost every ten years. Curriculum 2013 is the newest curriculum, introduced to all Indonesian schools in 2013. It was implemented for all subjects in all year levels. Curriculum 2013 is based on two levels of competencies: Core Competencies and Basic Competencies. There are four Core Competencies for all subjects and all year levels. Those Core Competencies are similar and evolves through the curriculum between years. Core Competency 1 refers to the religious doctrine followed by Indonesian students. Core Competency 2 is competency of social attitudes and shows attitudes of Indonesian culture that are especially related to the society and experience of students. Core competence 3 and Core Competency 4 are about the special knowledge and skills of each subject. Basic Competencies change according to the subject and year level. The teaching of *Ilmu Pengetahuan Alam* (IPA) in curriculum 2013 varies according to the level of school. In primary school, in the low grade, years 1-3 there is no science content in the curriculum, and in the high grade, years 4-6 teachers are expected to teach science integrated with other subjects, rather than as a separated subject. In junior secondary, the teacher is expected to teach it as a discipline and integrated science. The integrated science in junior high school was blended among biology, physics, and chemistry. Moreover, the philosophy of integrated science in Indonesia, biology subject become the core of science because the nature of science is the big issue and the foundation of human living. In addition, the integrated science also describes in basic competencies, which one basic competency can be taught in biology,

physic, and chemistry content. The appropriate types of integrated science in curriculum 2013 is the traded type because the concept of this types is integrated not only the knowledge, but also integrated the skills, and the attitudes of students. The teaching with integrated science can be implemented in two ways, such as inter-disciplinary for the integration between each discipline. For example, integrated science content with language content and intra-disciplinary which the integration between each discipline in one subject. For instance, the integration among biology, physics, and chemistry.

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