Volume 4, Nomor 2, November 2020
P-ISSN: 2580-5525
E-ISSN: 2580-5533

JURNAL KEPENDIDIKAN

PENELITIAN INOVASI PEMBELAJARAN

JURNAL KEPENDIDIKAN

Volume 4, Nomor 2, November 2020

Volume 04 | Nomor 02 | Halaman 185 - 386 | Yogyakarta, Indonesia November 2020

Volume 4 Nomor 2, November 2020
P-ISSN: 2580-5525
E-ISSN: 2580-5533

JURNAL KEPENDIDIKAN

PENELITIAN INOVASI PEMBELAJARAN

Penerbit
Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM)
Universitas Negeri Yogyakarta
Bekerjasama dengan
Masyarakat Penelitian Pendidikan Indonesia (MPPI)

Periode Terbit
Dua kali setahun setiap bulan Mei dan November

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Mei 1980

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        Kusuma, F. I., Sutadji, E., & Tuwoso.(2014). Kontribusi dukungan orang tua, penguasaan pengetahuan dasar, dan motivasi berprestasi terhadap pencapaian kompetensi kejuruan. *Jurnal Kependidikan, 44*(1),1-14. Diunduh dari:http://journal.uny.ac.id/index.php/jk/article/view/2187. (cantumkan DOI, jika ada).
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        (semua pengarang disebutkan jika lebih dari 1 penulis)
      - Artikel dalam surat kabar/majalah:
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Volume 4, Nomor 2, November 2020
P-ISSN: 2580-5525
E-ISSN: 2580-5533

JURNAL KEPENDIDIKAN

PENELITIAN INOVASI PEMBELAJARAN

Riwayat Jurnal Kependidikan

Jurnal Kependidikan: ***Penelitian Inovasi Pembelajaran*** merupakan **kelanjutan** dari Jurnal IKIP Yogyakarta dan **Jurnal Kependidikan:** ***Jurnal Ilmiah Penelitian Pendidikan***yang terbit sejak tahun 1980 dengan Nomor ISSN: 0125-992X.Jurnal ini sudah terakreditasi Dikti pada tahun 2001 dan 2015 dengan Surat Keputusan Nomor 118/DIKTI/Kep/2001 Tanggal 9 Mei 2001 dan Nomor 12/M/Kp/II/2015 Tanggal 11 Februari 2015. Jurnal Kependidikan diterbitkan oleh Lembaga Penelitian Universitas Negeri Yogyakarta bekerja sama dengan Masyarakat Penelitian Pendidikan Indonesia (MPPI) sejak tahun 2012.

Khusus pada Volume 1 Nomor 1 Tahun 2017, Jurnal Kependidikan terbit pada bulan Juni 2017. Edisi selanjutnya Jurnal Kependidikan akan terbit pada bulan Mei dan November.

Berdasarkan SK Menteri Riset, Teknologi, dan Pendidikan Tinggi Nomor : 36/E/KPT/2019, tanggal 13 Desember 2019 tentang Hasil Akreditasi Terbitan Berkala Ilmiah, Jurnal Kependidikan dinyatakan sebagai Terbitan Berkala Ilmiah Terakreditasi, periode Februari 2015 sampai dengan Februari 2020

Volume 4, Nomor 2, November 2020
P-ISSN: 2580-5525
E-ISSN: 2580-5533

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DAFTAR ISI

halaman

EXPLORING PRE-SERVICE CHEMISTRY TEACHERS' PROBLEM SOLVING SKILLS ON VOCATIONAL CONTEXT-BASED LEARNING

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Abstrak

This research aimed to explore the effect of Context-Based Learning (CBL) with petroleum and polymer topics on pre-service chemistry teachers' (PsCT) problem-solving skills. Within pre-experimental research design, the study focused on the exploration of PsCT problem-solving skills. Through convenient sampling techniques, the sample of this study consisted of a total of 34 PsCT (10 males and 24 females), who enrolled into a vocational chemistry course. To collect the data, Rubric for Problem-Solving Skills (RPSS) were used to measure four aspects of problem-solving skills (namely identifying problems, collecting information, providing possible solution(s), and communicating a possible solution). These data were analysed according to descriptive statistics and one-way ANOVA. Three open-ended questions were used to explore their views of relevance, usefulness, and effectiveness of the CBL. There was a significant difference between the PsCT' problems solving skills of petroleum and polymer topic. The results also indicated that their problem-solving skills had still fell into the sufficient category. Further, they found the implementation of the CBL is relevant, useful, and effective. Since the implementation of the CBL is promising to improve the PsCT's problem-solving skills, thus it should be encouraged to analyse any problem comprehensively and make an appropriate conclusion.

Keywords: *context-based learning, pre-service chemistry teachers, problem-solving skills, vocational case*

INTRODUCTION

The 21st century learning system requires students to have and develop certain skills that involve critical thinking, problem-solving, creativity, innovation, and collaboration. Moreover, system thinking such as problem-solving skills has come to the attention of chemistry educators more predominantly in the past few years (Hrin, Milenkovic, Segedinac, & Horvat, 2017). Problem-solving skills require to intellectually, logically, and systematically select the best solution of the problems (Ahghar, 2012) and bring them to achieve the goals in solving complex problems (e.g., Chaudhry & Rasool, 2012; Yu, Fan, & Lin, 2015). The problem-solving skills not only help the students in solving academic problems but also in all problems of the life fields (Armagan, Sagir, & Çelik, 2009; Bolkan, Cakici, & Cakici, 2012). A better students' problem solving skills, a high probability of success in any kind of activities in everyday life. Students with strong problem-solving skills are life-long learners which are able to analyse critically some daily complex problems. Students may find difficulties in solving the outside problems of the academic field since their lack of opportunities in problem-solving in a real-life context. It means that this skill will be useful for students toward their future life. Students that have become habituated to practice problem-solving can adopt a new environment for life easier. Therefore, enhancing problem-solving

skills should be emphasized in chemistry learning both in high school and teacher education. They should develop students' thinking concerning real-life activities since it was promising to promote students' problem-solving skills (Gur & Kocak, 2017).

Good problem-solving skills became an essential factor in determining students' success in learning chemistry (Suyanta, Laksono, Fadhilah, & Rizky, 2019). Given the importance of students' problem-solving skills in supporting their learning outcomes, it is also needed to prepare the teachers with good problem-solving skills. Consequently, it should be prepared for the pre-service teacher during their teachers' preparation programme. Previous studies reported the effort in improving pre-service teachers problem-solving skills through several ways (e.g., Benli & Sarikaya, 2012; Çalışkan, Selçuk, & Erol, 2006; Mataka, Cobern, Grunert, Mutambuki, & Akom, 2014; Ultay, 2017). They applied problem-based learning to facilitate problem-solving skills and improve pre-service teachers' knowledge. Whereas other studies reported the use of context-based problem (e.g., environment, health) was improve students' thinking, motivation, and perception of science relevance (e.g., Ultay & Calik, 2012; Demircioğlu, Ayas, Demircioğlu, & Özmen, 2015; Ilhan, Yildirim, Yilmaz, 2016; Broman, Bernholt, & Parchmann, 2018; Habig, *et al*., 2018; Eny & Wiyarsi, 2019). This led to a new idea to use context-based learning in facilitating problem-solving skills of pre-service chemistry teachers' (PsCT). Context-Based Learning (CBL) has come to be widely used in chemistry teaching to enhance the learning quality (e.g., Demircioğlu, Demircioğlu, & Çalık, 2009; Acar & Yaman, 2011; Vos, Taconis, Jochems, & Pilot, 2011; Mataka & Kowalske, 2015; Eny & Wiyarsi, 2019). Eventhough the choice of appropriate contexts is crucial for CBL approaches to actually increase students' achievements (e.g., Sevian, Hugi-Cleary, Ngai, Wanjiku, & Baldoria, 2018; Broman *et al*., 2018), thus, choosing a context is relative to the circumstance of the study.

On the other hand, in the Indonesian national curriculum, chemistry is taught in general and vocational high schools. However, both programmes have a different purpose in chemistry subjects. Chemistry subjects in general high school aims to provide basic knowledge as a foundation to continue to higher education. While in vocational high schools, chemistry subject is expected to provide basic skills for students to develop their expertise competencies (Indonesian Ministry of Education, 2016). For instance, automotive engineering students learn hydrocarbons to understand more about vehicles fuel and combustion systems (e.g., Febrianto, Wiyarsi, Partana, & Sulistyo, 2018; Wiyarsi, Pratomo, & Priyambodo, 2020), the understanding of electrochemical concept as basic for comprehending combustion system and corrosion of vehicles components (Febiana, Partana, Wiyarsi, & Sulistyo, 2018). That is, the teacher should use appropriate context in chemistry learning for vocational students. Furthermore, Faraday, Overton, and Cooper (2011) state that the context dimension of the vocational school covers the nature of vocational subjects, learning environment, the specification of students' qualifications, and students' learning styles. The discrepancy of learning purpose in general and vocational schools require the specific capabilities for PsCT such as gaining enrichment content related to students' competence. Hence, it is needed for restructuring of the curriculum for PsCT education programs that are more concerned with professional development

in the context of vocational high schools (Wiyarsi, Hendayana, Firman, & Anwar, 2017). It seems that the implementation of the CBL with vocational context as a problem is useful for PsCT to train their problem-solving skills. Also, this experience will support their achievement of chemistry overall.

Through the implementation of CBL with vocational cases, PsCT has a good experience to solve chemistry problems in several specific areas. PsCT will understand the steps and function of problem-solving skills and help them be an advanced chemistry teacher for a vocational school in the future. The study will lead off the extending of context-based chemistry learning focused on vocational school for chemistry teacher preparation. CBL will overcome the obstacle of PsCT to correlate the chemistry concepts with automotive engineering problems. Accordingly, the study also promotes the ability of PsCT in designing appropriate learning for vocational high school. Hence, it will be a model for PsCT to give meaningful chemistry learning for the vocational high school students. Finally, it will support the increase of chemistry learning quality. Thus, this research aimed to explore the effect of CBL with petroleum and polymer topic on PsCT' problem-solving skills especially with the context of automotive-specific expertise. The following research questions guide the study: how does the PsCT' problem-solving skills in the CBL implementation with the vocational case?, is there a significant difference in PsCT' problem-solving skills on petroleum and polymer concepts?, at which point do the skills of PsCT still lack and need to be improved?, and how does the PsCT' view about CBL implementation with a vocational case?

METHODS

Within pre-experimental research with one shot design, the study focused on the exploration of PsCT problem-solving skills on CBL implementation. Since it employed pre-experimental design, thus this research did not measure pre-test and set control group before the teaching intervention. This is seeming like a limitation of the current study, however the study intended to depict PsCT problem solving skills after perceiving CBL. Through a convenient sampling technique, the sample covered a total of 34 PsCT (10 males and 24 females) who enrolled in vocational chemistry course in this study. The research sample established from third year chemistry teachers' candidate enrolled in teachers' preparation programme from a public university in Indonesia. The ages of PsCT were 20-21 years old. The PsCT were randomly divided into 10 heterogeneous groups. Therefore, PsCT worked in small groups consisted of 3-4.

The topics used in CBL were related to chemistry concept that was taught in vocational high school and especially applicative in automotive field, namely petroleum and polymer topics. The CBL conducted in two stages and finished in six weeks. The first stage deals with petroleum topic for the first three weeks and the last three following weeks deal with polymer topics.

The CBL was implemented through discussion in small groups and individual work with several steps. A narrative text related to the issues of the petroleum and polymer topic were used to initiate the discussion. In the first meeting, the PsCT were work in their group aboutidentifying problems, collecting information, providing possible solution(s), and communicating a possible solution concerning the narrative text (see the example of the narrative text

on Figure 1 that used in this research). The learning began when PsCT identified the problems according to the narration provided, compile the problems to be solved, and then construct the hypothesis towards the existing problems, thus there was no explanation by lecturer. Then, PsCT collect and record the information which needed in order to answer the problems. In this process, they were permitted to use any learning sources. The last step, PsCTs were elaborated their knowledge according to the information they obtained on the previous activity to answer the problems analytically and thoroughly. Then, in the next meeting, PsCT of some group presented the group discussion result in the class discussion. Another group shared their idea and questions. Lecturer gave feedbacks and strengthening about several concepts that were still consider to be confused by PsCT. In the last meeting, the PsCT work individually followed all steps such what they experienced in the first meeting. However, they work with different problem.

The data of PsCT' problem-solving skills were collected through observation using Rubric of Problem-Solving Skills (RPSS).

The aspects of RPSS were synthesized from several studies (e.g., Armagan, *et al*., 2009; Cheng, She, & Huang, 2018;

Figure 1. The Sample of The Narrative Text on Petroleum Topic

Intense socialization was carried out by Pertamina *(public oil company of Indonesia) on the use of non-subsidized premium and diesel fuel since 2013. The results give significant changing nowadays. The users of Pertamax and Pertamax plus in 2013 improve 20% compared to 2012. Likewise, with the Pertamina DEX and Biosolar non-subsidized diesel consumption. According to Afandi, as the General Manager Marketing PT Pertamina Region III, this growth shows that the public is starting to realize the importance of using fuel which good and precise, in addition to reducing the APBN expenditures, it also means that the public is aware of the need to minimize the negative impact of using petroleum on the condition of engine and environment. On the other hand, the Riau Provincial Government assesses that the policy of limiting subsidized solar supplies has a good impact on the trade in Crude Palm Oil (CPO).*

However, most people still complain the higher price of the high quality gasoline and diesel. Pertamax is not an ordinary product with a cheap price. There is additional technology to produce the Pertamax which bring the price is more expensive than the Premium or Pertalite as the ordinary product of gasoline. No wonder if in some places, there are creative people who are trying to make a gasoline that better than the Premium but with a cheaper price than the Pertamax by making a mixture of Pertamax and Premium.

On the other hand, the high demand of oil fuel in Indonesia recently inseparable from the rapid growing the number of vehicles, especially private vehicles. Increasing demand of motorcycle should be balanced with the additional services for motorcycle such as repair shop. From the repair shop activities also produced waste in the form of B3 waste including lubricants waste, batteries waste, and also a mechanic clothes that has been contaminated by solvents or lubricants. Although the lubricants waste still can be used, but if it is not managed properly, it will be harmful for the environment.

The increasing number of vehicles inevitably impacts the decline of the environment quality such as the air become dirty and hotter. Consequently, instead of the efforts to improve environmental quality, the government encourages the efforts to use fossil fuels effectively and efficiently and develop alternative energy sources that are considered feasible in terms of technical, economical and environmental aspects.

Chua, Tan, & Liu, 2016; Polya, 1945; Wehmeyer, Lattin, & Agran, 2001).The RPSS which consisted of 13 items, covered four aspects i.e. identifying problems (4 items), collecting information (2 items), providing possible solution(s) (4 items), and communicating a possible solution (3 items). A group of experts (chemistry educators) looked over the RPSS to ensure the appropriateness of instrument. Based on the experts' suggestions, the RPSS was revised. For example, in the term of oral communication that belongs to the aspect of communicating a possible solution was deleted. Because according to the experts' suggestion, since the students were work in a small group therefore they presented the possible solution in a group, thus it will be difficult to observe their individual communication skills. Other revisions were made concerning the appropriateness of the criteria used in the RPSS, mistake in Indonesian grammar rule, and error typing. In addition, three open-ended questions were used to explore the PsCT's view about the relevance, usefulness, and effectiveness of the CBL implementation.

The data of PsCT's problem-solving skills on the petroleum and polymer topics were analysed according to the descriptive statistics. The possible response to the RPSS brought up the categories and frequencies. The mean scores were classified into five categories within the range of poor category if the mean score < 1.8; 1.81-2.60 identified as a less good category; 2.61-3.40 signified sufficient category; 3.41-4.20 implied good category; and if the mean score > 4.20 indicated a very good category. Moreover, one-way Analysis of Variance (one-way ANOVA) was used to examine the difference among the PsCT's problem-solving skills on the petroleum and polymer topics. As for the PsCT responses to open-ended questions were analysed qualitatively by grouping the similar responses.

RESULTS AND DISCUSSION

According to Table 1, the results indicated that overall PsCT problem-solving skills had still fell into the sufficient category. PsCT signified a less good category in providing possible solution(s) on petroleum topics and collecting information on polymer topics. Both on petroleum and polymer topics, the PsCTs' identifying problems skills equally good. Furthermore, in order to determine of PsCTs' problem solving skills among petroleum and polymer topics, one-way ANOVA was performed and the results presented in Table 2. As seen from Table 2, the ANOVA calculated that value of $F(33) = 7.746$ at $p = 0.007$. It means that there is a significant difference in PsCT's problem-solving skills for petroleum and polymer topics. It can be inferred that

Table 1
The Category of Problem-solving Skills of PsCT on Petroleum and Polymer Topics

Aspect	Petroleum	Category	Polymer	Category
Identifying problems	3.34	Good	3.58	Good
Collecting information	3.04	Sufficient	2.54	Less good
Providing possible solution(s)	2.30	Less good	2.95	Sufficient
Communicating a possible solution	2.62	Sufficient	3.49	Good
Overall	2.82	Sufficient	3.14	Sufficient

Table 2
One-way ANOVA Result of PsCT' Problem-solving Skills in Petroleum and Polymer Topic

Aspect		Sum of Squares	Mean Square	F	Sig.*
Identifying problems	Between Groups	0.773	0.773	2.833	0.097
	Within Groups	18.009	0.273		
	Total	18.782			
Collecting information	Between Groups	4.250	4.250	8.162	0.006
	Within Groups	34.368	0.521		
	Total	38.618			
Providing possible solution(s),	Between Groups	7.118	7.118	19.725	0.000
	Within Groups	23.816	0.361		
	Total	30.934			
Communicating a possible solution	Between Groups	12.654	12.654	29.591	0.000
	Within Groups	28.222	0.428		
	Total	40.876			

Ket: *statistical significance difference of 0.05

there is significant difference of PsCT' collecting information, providing possible solution(s), and communicating a possible solution skill.

Phrase differently, there was no different on the identifying problems skills.Based on PsCT responses to the open-ended question, it concluded that the PsCT has a positive view toward CBL implementation on its relevance, usefulness, and effectiveness. This relevance is related to the topic that is in accordance with the needs of PsCT to become a professional teacher in vocational high schools. The PsCT agrees that the topic had they learned is needed to support the development of professional and pedagogical competencies, the mastery of vocational content in Automotive Engineering, and more in-depth insight into the curriculum of vocational high schools.

Related to the usefulness of CBL implementation, The PsCT state that it helps them in developing thinking skills and increasing their self-efficacy to teach in vocational high school. The PsCT have positive opinions of the CBL effectiveness. The course is seeming as good, directed, structured, useful and support the readiness of PsCT to teach in vocational schools. Whereas opinions related to the reason that make the PsCT fewer conveniences are the number of tasks being a burden on their own, group members who are always the same make the PsCT bored, and the ineffective time during group presentation.

Enhancing problem-solving skills should be emphasized in chemistry learning both in high school and teacher preparation programme. Because the two educational programmes offer to develop their thinking concerning real-life activities and it was promising to promote students' problem-solving skills in chemistry. Thus, the implementation of CBL is strongly suggested in the chemistry teaching in order to provide meaningful chemistry

learning and relevance with everyday life. The discussion concerning the results of the current study presented regarding the research questions aforementioned.

The PsCTs have a sufficient level of overall problem-solving skills for both, petroleum and polymer topics (see Table 1). CBL as the active learning approach provides the activities and real-life problems found by PsCT that beneficial in order to develop their thinking skills, understand the context, and connect the context with scientific discourse (e.g., King & Henderson, 2018; Surif, Ibrahim, & Dalim, 2013; Sevian *et al*., 2018; Ultay & Calik, 2012). The implementation of CBL has opened the PsCT's insight on the important concepts needed to overcome automotive-related problems. The PsCT could correlate the chemistry concept with automotive field in every chemistry learning. Moreover, CBL with open-ended problems is considered to give chance to PsCT in developing their problem-solving skills. Otherwise, the skills of PsCT that not optimal yet, may cause by the characteristic of the content knowledge. Within the scope of chemistry, petroleum and polymer content are included in the knowledge that is complex and involves many prerequisites knowledge. Moreover, in this case, chemistry concept uses for solving the problem in automotive context. Thus the prepared chemistry problems on the narrative text provides in the Figure 1. The PsCT with a lack understanding of concepts' application tends to have difficulties in using petroleum and polymer concepts to solve the real-life problems (Wiyarsi *et al*., 2020).

There was found significantly difference among PsCT' problem-solving skills on petroleum and polymer topic with the favour on polymer topic (see Table 2). The fact that the PsCT' problem-solving skills on polymer better than petroleum topic may result from their experiences. These experiences related to much more interaction with the concept and much more engage in a workgroup when solving the problems. Based on Indonesian National Curriculum, PsCT learn a limited concept without any concept application about petroleum and polymer during high school and first year of university level. Indeed, some of PsCT can take the elective course that concerned with Industrial Chemistry and Polymer Chemistry (Wiyarsi *et al*., 2017). However, the courses did not discuss the concept application on the automotive field specifically. Another experience revealed that working in a group affects PsCTs' problem-solving skills. Problem-solving scientific results of the same content were better in collaborative work than if it is done individually. Similarly, Winarti, Rahmini, and Almubarak (2019) reported that collaborative problem solving is promising as an alternative strategy in eliciting students' thinking skills. Therefore, through the group collaboration, PsCT can exchange ideas, listen to each other, accept each other's' ideas, and make decisions together. It gives a wider opportunity for them to promote reasoning and commonly improve their problem-solving skills.

In addition, the broader of context would allow the students to make a better connection among the chemistry concept to their daily life that brings an opportunity to investigate their own hypothesis perceived by themselves (George-Williams, Ziebell, Thompson, & Overton, 2020). As suggested by Avikasari, Rukayah, and Indriayu (2018) that making chemistry learning relevant with daily life issues is beneficial to enhance students' interest in exploring a new chemistry knowledge. The learning experience related with exploring knowledge, referring the

literature, the way in conducting inferences, interpreting and communicating are used as a way to develop the professional teacher (Garet, Porter, Desimone, Birman, & Yoon, 2001). Furthermore, CBL becomes an alternative learning approach in order to achieve teacher education goals due to the emphasizing of the authentic and meaningful situations involvement (e.g., Wiyarsi, Sutrisno, & Rohaeti, 2019; Eshetu & Assefa, 2019). It serves as a foundation of PsCT' investigation skills development.

Observing the category and difference of the aspect of PsCT' problem-solving skills among petroleum and polymer topics on Table 1 and Table 2 respectively, there were signified that the PsCT problem-solving skills is not at the best level yet. It may generate from three aspects of skills that should be improved including collecting information, providing possible solution(s), and communicating a possible solution. Another aspect problem-solving skills namely identifying problems is gained a better category by PsCT. The findings on this research confirmed previous study by Ozgen (2019) that a good students' problem-posing skills leads to the students' easiness in identifying a problem. In this study, every PsCT needs to write important information based on narrative text that used as a basis in formulating the problems that should be solved. Through this activity, the PsCT practice their critical thinking in selecting the important information and deciding the problems that appeared according to the chemistry point of view and directly correlate into the automotive field.

The first aspect of PsCT' problem-solving skills that need to be improved is the collecting information from a reliable source skill. The expected skills concerning this aspect covering the collecting information from a references in the form of scientific journals, textbook for university students, and published and unpublished scientific articles. However, in this research, most of the PsCT' only access the information from the internet in the form of private weblog and high school chemistry books. The information provided by private weblog is not recommended due to the information were not reliable and accountable. While, the information on high school chemistry books is limited. The findings of this research also revealed that most of PsCT had the most difficulties in finding the learning sources about polymer on the automotive fields. The fact that most of PsCT have not been accustomed to find an international literature sources, both textbooks and journals brings up the results of recent study. It has been proven because there were already many journals and textbooks discussing about polymer and has been developed for the automotive field. For example, the thermoplastic olefin elastomers which used as exterior accessories, sound absorbers, instrument panels and polypropylene for replacement plate materials in the car's interior and car hood. The skills in collecting information from reliable sources need to be improve by giving a knowledge on how to access the primary learning sources about the discussed topics.

The second aspect of problem-solving skills that had a poor category and need to be enhanced was providing possible solution(s). The PsCT should provide as much as possible solution(s) of the problems and explain the rational and scientific reasons of the problems. The PsCT ability in processing the information and using the chemical understanding to answer the problems will be seen in this process. It can't be denied that the PsCT' prior knowledge and experiences in the term of chemistry content gives a significant effect towards their ability in solving the problems. The result of this study confirmed

by Esen-Aygun (2018) that pre-service teachers who are cognitively flexible are able to solve problems constructively and persistently. As a consideration, CBL needs extra-situational knowledge from the context not only from science declarative knowledge but also its application in the everyday life (Herranen, Kousa, Fooladi, & Aksela, 2019). Thus, PsCTs require this kind of extra-situational knowledge in order to provide possible solution(s).

On the other hand, the difficulties may arise from the emergence of sharp differences between group members that affect group effectiveness in elaborating all knowledge to determine a conclusion. The PsCT requires to claim a possible solution generated from data-based reasoning (Kim & Pegg, 2019). The PsCT should describes the solution of the problems comprehensively with a deep analysis (Esen-Aygun, 2018). Thus, PsCT were required to provide scientific reasons from the solution given as clearly as possible through the elaboration of various knowledge. For example, when they asked about *the difference between premium and pertamax.*The solution of this problem not only refers to the price of the pertamax that more expensive or due to the higher of octane numbers of pertamax than premium. The two kindsof solutions should benot arising from PsCT. Because they have known the chemistry knowledge related the aforementioned topics, accordingly they should be giving another possible solution that more scientific based on chemistry concept of view. Thus, the appropriate solution concerning the problem should be by describing the difference quality from both gasoline according to the value of octane numbers. Hence, not only write that the octane number is higher but also describe how the octane numbers gives an effect on the quality of both gasolines.

The other example found when the PsCT were asked about the *important reason of vulcanisation in the vehicle tire processing.* The solution that should provide by PsCT not only limited on the improving of rubber elasticity, but also the emphasized on the reason of vulcanisation, itmakes the quality of rubber elasticity improved. The skills to give a comprehensive and thorough descriptions are needed to provide a better possible solution. In this case, it is not only critical thinking skills that needed, but also the ability to explain and provide scientific reasons in order to choose the best problem-solving solutions. This ability is related to the use of scientific argumentation. The PsCT should be able to express their ideas to solve the problem with proper scientific evidence. Enhancement of PsCT argumentation ability is requires to achieve deeper view in solving every automotive problem related to the application of petroleum and polymer concept. As suggested by Bağ and Çalık (2017) that scientific argumentation is influenced by initial knowledge, motivation, and classroom atmosphere. Therefore, the classroom atmosphere in active learning such as CBL could facilitates PsCT' in providing a good possible solution(s). Moreover, Sulaiman (2010) work revealed that the process in solving a problem needs the PsCT' ability to correlate the idea from their existing knowledge to provide an accurate solution of the problems. It means that the PsCT' skills in giving a comprehensive solution analysis can't be separated by their prior knowledge. The result of this study confirmed the previous study conducted by Chang (2010) and Overton (2013) that reported the ability in solving problems is affected by the cognitive level and science process skills of pre-service teachers. Furthermore, a good collaborative work is

needed to achieve a better possible solution (Kelly, McLoughlin, & Finlayson, 2016). Therefore, the implementation of CBL using small group collaboration is potential to develop providing possible solution(s) of problem-solving skills.

The last aspect of problem-solving skills that needs to be increased was communicating a possible solution because in this study, it signified a poor category. Concerning this aspect, previously many students were failed in drawing a conclusion due to the limited time allocation, they spent most of their time in making observations and collecting data (Kim & Pegg, 2019). However, the expected ability from this aspect is drawing a conclusion from the possible solution(s) and presents it in the narration form. There were two deficiencies as the dominant factors found in groups collaborating PsCT' work, namely: writing the conclusion in the form of points but not represent from all of the given problems and drawing the conclusion in the form of very simple narration. The ability to draw a conclusion is not easy due to the PsCT require to be able to take and reveal the core of the problems. The result of Zhang Lundeberg, and Ebehardt (2011) works was support the result of this research that the ability to re-express is one aspect that plays important role in the successful of problem-solving process. The application of CBL facilitates students to construct their understanding through group collaboration. Hence, the implementation of CBL for vocational context should be further use.

The experience to solve problem in specific context is beneficial for the PsCT. Thus, they will apply their experiences to solve automotive problems that will increase the enthusiasm of vocational high school students. It will ultimately have an impact on improving the quality of chemistry learning. A positive view means that the PsCT have open-minded through the new experience. It helps the PsCT to enjoy the activities in solving the problem process. A good perception and feeling increase the PsCT problem-solving skills. Furthermore, CBL becomes an alternative learning approach in order to achieve teacher education goals due to the emphasis of the authentic and meaningful situations involvement (e.g., Wiyarsi *et al*., 2019; Eshetu & Assefa, 2019). Through CBL, PsCT has the opportunities to construct their knowledge and develop the skills in applying chemistry concepts to the new situations including the vocational context through the effective interaction and collaboration.

CONCLUSION AND IMPLICATIONS

Concerning CBL implementation, it is one of the learning strategy based on the activities and real problems which play as an important role in providing opportunities for PsCT to enhance their problem-solving skills. Thus, the PsCT could develop the implementation of CBL into chemistry concept in a new environment such as the vocational context, effective interaction, and inquiry collaboration. The result of this research implied that the PsCT' problem-solving skills had a sufficient category, consequently it need to be enhanced especially in collecting information, providing possible solution(s), and communicating a possible solution skill. Hence, constructing scientific reasoning habits in problem-solving skills is needed to improve the three aspects of problem solving skills (Becerra-Labra, Gras-Marti, & Torregrosa, 2012; Wiyarsi & Çalik, 2019; Çalik & Karataş, 2019).

This research suggests that constructing PsCT' problem-solving skills is required in order to fulfil a successful 21st century learning system, still the thinking training could develop problem-

solving skills (Gur & Kocak, 2017). Moreover, the process in preparing pre-service teachers should involve them in more number of cases in order to generate and enhance their problem-solving skills as suggested by Bars and Oral (2017). A better PsCT' problem-solving skills lead a meaningful chemistry learning in vocational high school that bring a better students' motivation and chemical literacy (e.g. Wiyarsi *et al*., 2020). Varying research sample in relation with the grades, perceiving into another chemistry topic, and utilizing blended learning as the learning equipment in the chemistry teaching (Fitriyana, Wiyarsi, Ikhsan, & Sugiyarto, 2020; Wiyarsi *et al*., 2019) should be considered in the future studies in order to determine the effectiveness of CBL. Hence, the implementation of CBL should be valuable for chemistry learning at vocational high school.

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PENGARUH PEMBELAJARAN BERBASIS MASALAH TERHADAP MINAT BELAJAR KIMIA PESERTA DIDIK

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Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh penerapan model pembelajaran *problem-based learning* (PBL) terhadap minat belajar kimia peserta didik pada topik kesetimbangan kimia. Penelitian ini merupakan penelitian kuantitatif jenis *quasi eksperiment* dengan menggunakan *posttest only design*. Penelitian dilaksanakan di SMA Negeri 6 Pekanbaru. Sampel ditentukan menggunakan teknik *simple random sampling*. Data minat belajar kimia peserta didik dikumpulkan menggunakan kuesioner berdasarkan lima kategori, yaitu tingkat minat peserta didik terhadap kimia, pilihan pribadi, peran guru, minat situasional, dan kemauan mengikuti pembelajaran kimia. Data kuantitatif dianalisis menggunakan *mean*, standar deviasi, persentase, dan uji hipotesis *One-Way ANOVA*. Analisis deskriptif digunakan untuk mendeskripsikan minat belajar kimia. Hasil penelitian menunjukkan bahwa terdapat perbedaan signifikan minat belajar kimia antara peserta didik yang menerapkan model pembelajaran PBL dan model pembelajaran ekspositori pada topik kesetimbangan kimia. Minat belajar kimia peserta didik masih tergolong rendah, namun peserta didik yang menggunakan model PBL menunjukkan skor yang lebih tinggi daripada kelas ekspositori. Peserta didik laki-laki lebih tertarik pada kimia daripada peserta didik perempuan.
Kata kunci: *problem based learning, minat, belajar kimia, kesetimbangan kimia*

THE EFFECT OF PROBLEM BASED LEARNING ON STUDENTS' INTEREST IN CHEMISTRY

Abstract

This study aims to determine the effect of applying the problem based learning (PBL) learning model to students' interest in learning chemistry on the topic of chemical equilibrium. This research is a quantitative research type of quasi experiment using posttest only design. The study was conducted at SMA Negeri 6 Pekanbaru. The sample was determined using simple random sampling technique. Data on students 'interest in learning chemistry are collected using a questionnaire based on five categories, namely the level of students' interest in chemistry, personal choice, teacher's role, situational interest, and willingness to attend chemistry learning. Quantitative data were analyzed using mean, standard deviation, percentage, and One-Way ANOVA hypothesis testing. Descriptive analysis is used to describe the interest in learning chemistry. The results showed that there were significant differences in interest in learning chemistry between students applying PBL learning models and expository learning models on the topic of chemical equilibrium. Interest in learning chemistry of students is still relatively low, but students who use the PBL model show higher scores than expository classes. Male students are more interested in chemistry than female students.
Keywords: *problem based learning, interest, chemical learning, chemical equilibrium*

PENDAHULUAN

Perubahan mendasar sedang terjadi pada pembelajaran sains tentang persepsi pendidikan dan hubungan teknologi dengan masyarakat. Perubahan itu terjadi pada kegiatan pendidikan menggunakan pendekatan konstruktivisme (Taber, 2011, p. 40). Kegiatan pendidikan menggunakan berbagai model pembelajaran aktif digunakan dalam proses pembelajaran untuk menghasilkan individu yang kreatif, dapat menyesuaikan diri dengan kerja sama tim, dan mampu menemukan solusi untuk masalah kehidupan sehari-hari menggunakan pengetahuan dan keterampilan yang diperoleh (Gunter & Alpat, 2016). Model pembelajaran aktif yang menyediakan interaksi antara peserta didik, antara peserta didik dengan teknologi, dan antara peserta didik dengan guru menggunakan sumber informasi dan teknologi, telah menjadi fokus penelitian pendidikan.

Salah satu upaya pemerintah untuk mengembangkan kegiatan pendidikan tersebut adalah dengan menerapkan Kurikulum 2013. Kurikulum 2013 diharapkan dapat menghasilkan pelajar yang produktif, kreatif, dan inovatif melalui penguatan sikap, keterampilan, serta pengetahuan yang terintegrasi. Hal ini dalam rangka menyongsong perkembangan kehidupan dan ilmu pengetahuan Abad 21. Implementasi Kurikulum 2013 dalam pembelajaran merupakan proses pembelajaran yang dirancang sedemikian rupa agar peserta didik secara mandiri dan aktif mengkonstruk konsep, hukum, atau prinsip melalui tahapan-tahapan mengamati, merumuskan masalah, merumuskan hipotesis, mengumpulkan data dengan berbagai teknik, menganalisis data, menarik kesimpulan, dan mengomunikasikannya (Hosnan, 2014, p. 34). Akan tetapi, tenaga pendidik masih menganut cara konvensional yakni pembelajaran berorientasi *teacher centered* dan ini kurang sesuai dengan tuntutan kurikulum (Maharani, Rahayu, & Fajaroh, 2019). Pembelajaran yang berpusat pada peserta didik menjadi studi penelitian yang penting di kalangan pendidik. Peserta didik yang terlibat aktif menghasilkan pengetahuan berasal dari diri mereka sendiri. Kondisi saat ini, peningkatan potensi peserta didik belum difasilitasi dengan baik (Suyanta, Laksono, Fadhilah, & Rizky, 2019).

Keberhasilan penerapan Kurikulum 2013 dipengaruhi oleh pihak sekolah dalam menerapkan dan memaksimalkan pelaksanaan Standar Proses. Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 65 Tahun 2013 tentang Standar Proses Pendidikan Dasar dan Menengah menganjurkan untuk mendorong kemampuan peserta didik dalam menghasilkan karya kontekstual, baik individual maupun kelompok dengan menggunakan model pembelajaran yang menghasilkan karya berbasis pemecahan masalah (*project-based learning*). Model pembelajaran yang diharapkan dalam penerapan Kurikulum 2013 meliputi karakteristik tematik terpadu, pendekatan *scientific*, *discovery learning*, *problem based learning*, dan *project based learning.* Pembelajaran berbasis masalah atau *problem based learning* (PBL) adalah salah satu dari model pembelajaran aktif ini (Tarhan, Ayar-Kayali, Urek, & Acar, 2008).

Pembelajaran menggunakan PBL menuntut guru agar dapat menciptakan masalah berdasarkan hasil kurikulum yang diinginkan, karakteristik peserta didik, dan situasi dunia nyata (Golightly & Raath, 2015). Komariah, Sofyan, dan Wagiran (2019) menyatakan bahwa kelebihan model ini adalah dapat meningkatkan aktivitas peserta didik, membantu mentransfer pengetahuan mereka dalam memahami

kehidupan nyata, dan mengembangkan kemampuan berpikir kritis peserta didik. PBL merupakan model pembelajaran yang efektif dalam meningkatkan prestasi akademik peserta didik (Gunter & Alpat, 2016). PBL berbeda dari pembelajaran yang bersifat konvensional karena peserta didik bekerja dalam tim di seluruh proses pembelajaran dan berusaha mencari solusi untuk skenario masalah dengan mengumpulkan berbagi informasi dan ide. Overton dan Randles (2015) menyatakan bahwa PBL paling mudah diterapkan dalam pembelajaran kimia dalam konteks kehidupan nyata mudah diidentifikasi.

Salah satu topik kimia yang erat kaitannya dengan kehidupan nyata adalah kesetimbangan kimia. Konsep-konsep tentang kesetimbangan kimia yang harus dipahami oleh peserta didik yaitu mencakup kesetimbangan dinamis, tetapan kesetimbangan, dan faktor-faktor yang mempengaruhi pergeseran kesetimbangan. Topik kesetimbangan kimia merupakan salah satu topik yang telah dimasukkan di antara topik-topik dari sebagian besar topik kimia yang sulit untuk dipahami (Akram, Surif, & Ali, 2014). Konsep kesetimbangan kimia sulit untuk dipahami bahkan oleh peserta didik sekolah menengah.

Model PBL memiliki peran dalam meningkatkan perhatian, aktivitas belajar, dan minat peserta didik terhadap materi yang dipelajarinya. Krapp dan Prenzel (2011) menyatakan bahwa faktor kunci dalam bidang pendidikan sains adalah minat. Seorang pendidik harus mampu meningkatkan minat peserta didik, hal ini dapat dilakukan dengan menghilangkan faktor-faktor yang berperan dalam penurunan minat peserta didik terhadap mata pelajaran kimia (Akram, Ijaz, & Ikram 2017). Minat sering digambarkan sebagai hubungan individu dengan objek dan memungkinkan seseorang untuk secara sukarela terlibat dalam kegiatan tertentu dan menunjukkan partisipasi serta kepuasan yang disengaja daripada kemalasan terhadap objek tersebut (Çiçek & Ilhan, 2017). Adodo dan Gbore (2012) mengungkapkan bahwa minat itu lebih diutamakan daripada kedisiplinan dan minat merupakan kunci keberhasilan pendidikan. Jika peserta didik tidak tertarik pada kimia, mereka cenderung tidak berusaha untuk belajar dan memahami makna konsep yang diajarkan kepada mereka. Hal ini menunjukkan bahwa faktor paling efektif yang berkontribusi terhadap keputusan peserta didik untuk belajar kimia adalah minat mereka terhadap kimia (Hofstein & Mamlok-Naaman, 2011). Berdasarkan uraian di atas, penelitian ini bertujuan untuk mengetahui pengaruh penerapan model pembelajaran PBL terhadap minat belajar kimia peserta didik pada topik kesetimbangan kimia di SMA Negeri 6 Pekanbaru. Kurikulum 2013 telah diterapkan di sekolah tersebut, namun model pembelajaran PBL belum diterapkan dalam proses pembelajaran.

METODE

Penelitian ini merupakan penelitian kuantitatif dengan jenis penelitian *quasi experiment*. Penelitian dilaksanakan di SMA Negeri 6 Pekanbaru. Penelitian dilakukakan pada bulan Oktober-November 2019. Desain penelitian yang digunakan adalah *posttest only design*. Sampel penelitian diambil dengan menggunakan teknik *simple random sampling*, sehingga terpilih dua kelompok peserta didik yaitu kelompok eksperimen dan kelompok kontrol yang jumlah keseluruhannya 59 orang. Kelompok eksperimen menerapkan model PBL sedangkan kelompok kontrol menerapkan model pembelajaran ekspositori. Skema rancangan penelitian ditunjukkan pada Tabel 1.

Tabel 1
Rancangan Penelitian Posttest only Design

Kelompok	Perlakuan	*Posttest*
Eksperimen	X_1	Q
Kontrol	X_2	Q

Keterangan:
X_1 = pembelajaran dengan model (PBL)
X_2 = pembelajaran dengan model ekspositori
Q = kuesioner minat belajar kimia

Instrumen penelitian ini adalah instrumen pembelajaran berupa silabus, Rencana Pelaksanaan Pembelajaran (RPP) dan Lembar Kegiatan Peserta Didik (LKPD) yang digunakan pada proses pembelajaran dan instrumen pengukuran berupa kuesioner yang diberikan kepada peserta didik pada akhir proses pembelajaran. Kuesioner dianalisis agar diperoleh skor masing-masing peserta didik.

Kuesioner digunakan untuk mengumpulkan tanggapan tertutup dari para peserta didik. Kuesioner terdiri dari 30 pernyataan yang 20 diantaranya merupakan pernyataan positif dan 10 pernyataan negatif. Kuesioner yang digunakan berdasarkan lima kategori, yaitu tingkat minat peserta didik terhadap kimia, pilihan pribadi, peran guru (Akram *et al*., 2017), minat situasional (Basso *et al*., 2018), dan kemauan mengikuti pembelajaran kimia. Para peserta didik diharapkan untuk menanggapi dengan menyatakan tingkat persetujuan mereka terhadap pernyataan yang diberikan.

Data kuesioner diolah agar diperoleh skor dan nilai minat dari masing-masing peserta didik dan dianalisis menggunakan *mean*, standar deviasi, persentase, dan menguji hipotesis menggunakan uji statistik parametrik *One-way ANOVA* dengan bantuan program *IBM SPSS 21.0 for Windows*. Adapun analisis deskriptif digunakan untuk mendeskripsikan minat belajar kimia peserta didik.

HASIL PENELITIAN DAN PEMBAHASAN

Perbedaan minat belajar kimia peserta didik dapat dilihat berdasarkan hasil kuesioner. Nilai rata-rata minat belajar kimia peserta didik kelas eksperimen dan kelas kontrol berturut-turut adalah 72,39 dan 65,22. Hasil analisis uji hipotesis terhadap minat belajar kimia peserta didik menunjukkan signifikansi sebesar 0,001 (sig<0,05) sehingga dapat disimpulkan bahwa terdapat perbedaan signifikan minat belajar kimia antara peserta didik yang menerapkan model pembelajaran PBL dan model pembelajaran ekspositori pada materi kesetimbangan kimia.

Penerapan model PBL terbukti dapat meningkatan minat peserta didik terhadap pelajaran melalui proses pancingan masalah sehingga peserta didik tergugah untuk memecahkan masalah tersebut melalui penugasan-penugasan yang diberikan oleh guru (Komariah dkk., 2019). Masalah yang diberikan memiliki hubungan erat dalam kehidupan sehari-hari sehingga rasa ingin tahu peserta didik meningkat dan mereka dapat merasakan bahwa topik yang dibahas bermanfaat untuk dipelajari.

Peserta didik dituntut agar dapat berperan aktif dalam proses pemecahan masalah dan berbagi informasi dalam kegiatan kelompok kooperatif. Gunter dan Alpat (2016) menyatakan bahwa model pembelajaran PBL dapat meningkatkan minat peserta didik pada subjek, bahwa mereka merasa seperti peneliti dan ilmuwan sehingga pembelajaran menjadi lebih menyenangkan dan menarik. Pembelajaran dirancang agar peserta didik dapat belajar secara mandiri dalam membangun konsep kesetimbangan kimia melalui tahapan-tahapan implementasi model PBL yang dapat dilihat sebagai berikut.

Proses pembelajaran menggunakan model PBL diawali dengan penyajian suatu masalah (wacana atau bahan bacaan)

yang dapat membimbing peserta didik untuk menemukan konsep sesuai dengan tujuan pembelajaran. Guru mendorong dan membimbing peserta didik untuk mengajukan pertanyaan dan mencari informasi. Peserta didik diarahkan untuk dapat mengidentifikasi masalah dari wacana yang diberikan dan menentukan informasi yang mereka perlukan untuk menyelesaikan masalah terkait.

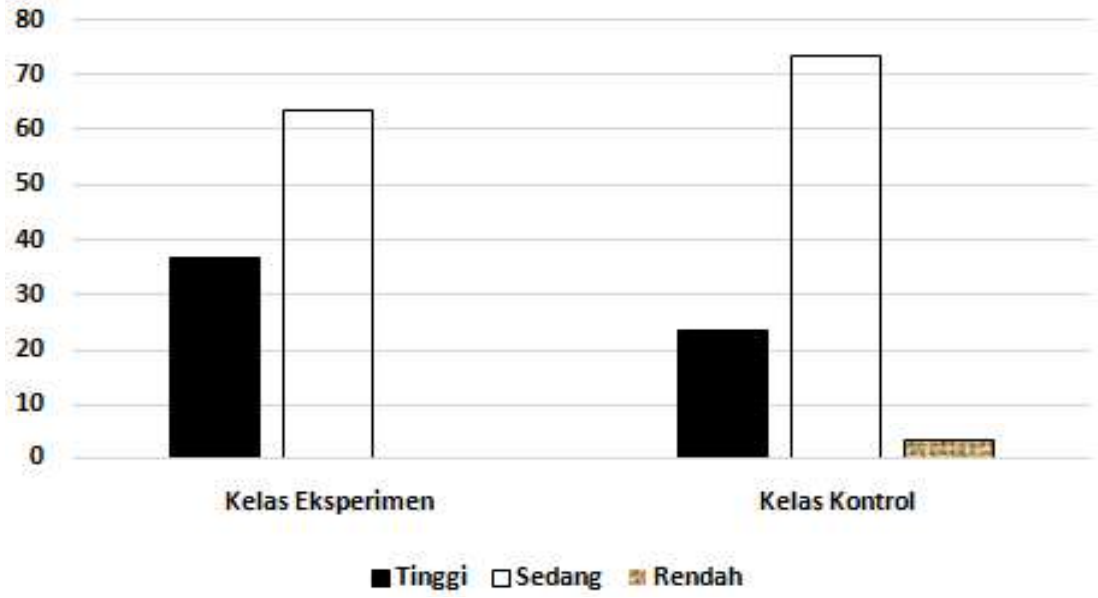
Setelah peserta didik berorientasi pada situasi masalah, guru mengatur peserta didik ke dalam pembelajaran kooperatif dengan membentuk tim kecil sebanyak enam kelompok untuk mengembangkan keterampilan kolaborasi di antara mereka dan membantu kegiatan penyelidikan terhadap masalah secara bersama. Guru membantu peserta didik untuk membuat subtopik pada situasi masalah. Sebagai contoh pada topik konsep kesetimbangan dinamis, dapat dibagi menjadi subtopik arah kesetimbangan, syarat-syarat terjadinya kesetimbangan, dan jenis-jenis kesetimbangan. Peserta didik mengumpulkan informasi dari berbagai sumber untuk menjawab pertanyan yang telah diidentifikasi. Guru terus mengajukan pertanyaan yang membuat peserta didik berpikir tentang materi yang dipelajari. Peserta didik dalam kelompoknya berdiskusi tentang konsep atau materi yang ditemukan, mengolah informasi, dan mengerjakan beberapa soal.

Guru meminta beberapa kelompok untuk mempresentasikan hasil diskusi dan membantu peserta didik yang mengalami kesulitan. Peserta didik mengemukakan pendapat atas presentasi yang dilakukan dan ditanggapi oleh kelompok lain. Salah satu langkah yang perlu dilakukan oleh seorang guru untuk menilai proses diskusi peserta didik yaitu satu anggota kelompok membuat presentasi di akhir penyelidikan masalah (Golightly & Raath, 2015). Kemudian, guru membantu peserta didik untuk menganalisis dan mengevaluasi proses berpikir mereka serta keterampilan investigasi dan intelektual yang mereka gunakan. Menyimpulkan tentang poin-poin penting yang muncul dalam kegiatan pembelajaran yang baru dilakukan.

Hasil analisis data menunjukkan bahwa rata-rata skor total minat belajar kimia peserta didik kelas eksperimen dan kelas kontrol berturut-turut adalah 86,8 dan 78,2 dari skor maksimal ideal 120. Kelas eksperimen menunjukkan nilai yang lebih tinggi daripada kelas kontrol. Pada kelas eksperimen, sebanyak 36,7% (11 peserta didik) mempunyai minat belajar kimia yang tinggi; 63,3% (18 peserta didik) mempunyai minat belajar kimia yang sedang; dan tidak ada peserta didik yang berada pada minat yang rendah. Kelas kontrol sebanyak 23,3% (7 peserta didik) mempunyai minat belajar kimia yang tinggi; 73,3% (22 peserta didik) mempunyai minat belajar kimia yang sedang; dan 3,3% (1 peserta didik) mempunyai minat belajar kimia yang rendah seperti ditunjukkan pada Gambar 1.

Tingkat persetujuan tertinggi pada faktor tingkat minat peserta didik terhadap kimia ditunjukkan pada pernyataan "Ketika saya belajar, terkadang saya benar-benar terpikat terhadap kimia" baik untuk kelas eksperimen (M=3,41; SD=0,68) maupun kelas kontrol (M=3,03; SD=0,89) seperti yang ditunjukkan pada Tabel 2. Hal ini menunjukkan bahwa minat belajar kimia yang tinggi menumbuhkan kemauan belajar peserta didik yang tinggi pula. Tabel 2 menunjukkan peserta didik merasa tidak terlalu suka dengan kelas kimianya. Suasana yang menyenangkan di dalam kelas diperlukan agar pembelajaran menjadi lebih menarik dan nyaman. Bukan hanya peserta didik yang harus berperan dalam menciptakan suasana menyenangkan, namun peran guru juga sangat dibutuhkan.

Gambar 1. Sebaran Kategori Minat Belajar Peserta Didik



Tabel 2
Analisis Faktor Tingkat Minat Peserta Didik terhadap Kimia

No	Tingkat Minat dalam Kimia	*Mean*	
		Eksperimen (S.D)	Kontrol (S.D)
1	Saya suka kelas kimia saya	2,45 (0,63)	2,33 (0,84)
2	Saya memiliki banyak pertanyaan tentang topik kesetimbangan kimia dalam pikiran saya.	3,34 (0,77)	2,33 (0,99)
3	Semakin sering saya mempelajari kimia, semakin menarik untuk didalami.	3,00 (0,76)	2,23 (0,77)
4	Kimia memiliki lingkup profesional yang sangat terbatas.*	2,86 (0,69)	2,83 (0,75)
5	Saya merasa bosan ketika harus mempelajari kesetimbangan kimia.*	2,83 (0,71)	2,60 (0,86)
6	Saya mengerjakan hal-hal yang tidak berkaitan dengan kimia selama pembelajaran kimia.*	3,03 (0,73)	2,80 (1,03)
7	Ketika saya belajar, terkadang saya benar-benar terpikat terhadap kimia.	3,41 (0,68)	3,03 (0,89)

Ket.: *Pernyataan negatif

Pernyataan "Saya memiliki banyak pertanyaan tentang topik kesetimbangan kimia dalam pikiran saya" juga disetujui oleh kelas eksperimen namun kurang disetujui oleh kelas kontrol. Hal ini menunjukkan bahwa peserta didik yang menerapkan model PBL memiliki rasa ingin tahu yang tinggi daripada kelas kontrol. Hal ini sejalan dengan Gunter dan Alpat (2016) yang menyatakan bahwa peserta didik lebih antusias dan lebih memiliki rasa ingin tahu dalam pembelajaran berbasis masalah, sedangkan peserta didik biasanya mendengarkan guru, mencatat definisi, dan rumus yang diberikan oleh guru dalam pembelajaran ekspositori. Sejalan juga dengan penjelasan Akram *et al*. (2017) bahwa rasa ingin tahu dapat membantu peserta didik untuk mengembangkan minat belajar kimia, demikian juga sebaliknya. Kurangnya rasa ingin tahu dapat menurunkan minat belajar kimia peserta didik.

Analisis faktor pilihan pribadi ditunjukkan oleh Tabel 3. Komponen minat mencakup komponen afektif dan kognitif. Komponen kognitif lebih erat kaitannya dengan perasaan pribadi tentang kimia (Herranen, Vesterinen, & Aksela, 2015). Pilihan pribadi dan keputusan individu sangat penting dalam menentukan minat peserta didik terhadap kimia. Peserta didik mencapai keberhasilan yang relatif lebih tinggi dalam suatu mata pelajaran atau topik tertentu jika mereka tertarik daripada mereka yang kurang tertarik (Çiçek & Ilhan, 2017). Respons tertinggi kedua adalah para peserta didik berusaha menjawab pertanyaan yang diajukan oleh guru. Guru harus menyadari bahwa minat belajar kimia peserta didik dapat ditingkatkan dengan adanya interaksi antara guru dengan peserta didik melalui diskusi dan tanya jawab.

Peran guru terlihat jelas berbeda antara kelas eksperimen dan kelas kontrol seperti ditunjukkan pada Tabel 4. Kelas kontrol memiliki respons lebih positif daripada kelas eksperimen. Tingkat persetujuan tertinggi ditunjukkan pada pernyataan "Di kelas kimia, guru pandai menjelaskan hal-hal yang berkaitan dengan kimia" (*M*=3,00, *SD*=0,74) dan "Guru melakukan tanya jawab selama pembelajaran kimia" (*M*=3,00, *SD*=0,69). Peran guru di kelas kontrol yang menerapkan model ekspositori lebih dominan daripada peran guru di kelas eksperimen yang menerapkan model PBL. Peserta didik tidak dituntut untuk menemukan materi secara mandiri, namun materi pelajaran disampaikan secara

Tabel 3
Analisis Faktor Pilihan Pribadi

No	Pilihan Pribadi	*Mean*	
		Eksperimen (S.D)	Kontrol (S.D)
1	Kimia bermanfaat untuk memecahkan masalah sehari-hari.	2,86 (0,79)	2,50 (0,82)
2	Saya berusaha menjawab pertanyaan yang diajukan guru.	3,24 (0,44)	2,83 (0,70)
3	Saya hanya mempelajari pelajaran kimia jika ada ulangan.*	2,79 (0,73)	2,60 (1,10)
4	Teori dalam kimia tidak dapat diubah atau dipertanyakan.*	3,31 (0,54)	2,93 (0,83)

Ket: *Pernyataan negatif

Tabel 4
Analisis Faktor Peran Guru

No	Peran Guru	*Mean*	
		Eksperimen (S.D)	Kontrol (S.D)
1	Guru kimia saya menggunakan bagan, model, dan contoh kehidupan sehari-hari untuk mengajarkan kami topik kesetimbangan kimia.	2,59 (0,78)	2,70 (0,88)
2	Di kelas kimia, guru saya pandai menjelaskan hal-hal yang berkaitan dengan kimia.	2,55 (0,63)	3,00 (0,74)
3	Guru kimia saya memberikan banyak perhatian kepada saya seperti halnya peserta didik lain.	2,48 (0,69)	2,70 (0,84)
4	Guru saya juga menyediakan waktu ekstra untuk membantu kami dalam mempelajari kimia.	2,17 (0,80)	2,30 (0,84)
5	Guru melakukan tanya jawab selama pembelajaran kimia.	2,86 (0,64)	3,00 (0,69)
6	Guru saya pasif selama pembelajaran kimia.*	2,86 (0,79)	2,73 (0,91)

Ket: *Pernyataan negatif

langsung oleh guru karena pembelajaran ini menekankan pada proses penyampaian materi secara verbal dari seorang guru.

Peran guru sebagai fasilitator sangat penting karena berpengaruh kepada proses belajar peserta didik. Perkembangan sikap positif peserta didik tentang kimia sebagai mata pelajaran sekolah adalah salah satu tanggung jawab utama setiap guru kimia. Walaupun peserta didik lebih banyak belajar sendiri, guru memiliki peranan yang penting dalam pembelajaran. Tugas guru tidak hanya menyampaikan informasi kepada peserta didik, tetapi guru harus menjadi fasilitator yang bertugas memberikan kemudahan belajar kepada seluruh peserta didik agar mereka dapat belajar dalam suasana yang menyenangkan, penuh semangat, dan berani mengemukakan pendapat secara terbuka. Peran guru sebagai tutor adalah memantau aktivitas peserta didik, memfasilitasi proses belajar dan menstimulasi peserta didik dengan pertanyaan. Guru harus mengetahui dengan baik tahapan kerja peserta didik baik aktivitas fisik ataupun tahapan berpikir peserta didik. Cheung (2009) menjelaskan bahwa kualitas pembelajaran kimia adalah penentu penting dan pengaruh terkuat dari sikap peserta didik terhadap kimia.

Tabel 5 menjelaskan tentang minat situasional, yaitu berkaitan dengan kenikmatan atau keterlibatan peserta didik terhadap pembelajaran (Basso *et al*., 2018). Para peserta didik cenderung kurang tertarik dengan topik kesetimbangan kimia. Namun, mereka meyakini bahwa bidang kimia adalah disiplin ilmu yang penting dan penting untuk diketahui. Tingkat persetujuan tertinggi ditunjukkan pada pernyataan "Saya pikir bidang kimia penting untuk saya ketahui" (*M*=3,17; *SD*=0,60).

Peserta didik di kelas PBL merasa percaya diri untuk tampil di kelas karena

Tabel 5
Analisis Faktor Minat Situasional

No	Minat Situasional	*Mean*	
		Eksperimen (S.D)	Kontrol (S.D)
1	Saya terpesona dengan topik kesetimbangan kimia.	2,38 (0,68)	2,27 (0,74)
2	Saya memilih untuk tampil karena saya benar-benar tertarik dengan topik kesetimbangan kimia.	2,34 (0,67)	2,00 (0,74)
3	Saya sangat senang bisa mempelajari topik kesetimbangan kimia.	2,76 (0,74)	2,30 (0,88)
4	Saya sangat menantikan untuk belajar lebih banyak tentang kimia.	2,97 (0,63)	2,03 (0,72)
5	Saya pikir bidang kimia adalah disiplin ilmu yang penting.	2,93 (0,70)	2,80 (0,71)
6	Saya pikir bidang kimia penting untuk saya ketahui.	3,17 (0,60)	2,60 (0,72)
7	Saya merasa minder untuk tampil di kelas karena saya tidak suka dengan topik kesetimbangan kimia.*	3,00 (0,65)	2,57 (0,90)

Ket: *Pernyataan negatif

mereka menyukai topik kesetimbangan kimia. Hal ini menjadi aspek yang sangat penting untuk ditingkatkan agar peserta didik menjadi lebih percaya diri dan tertarik terhadap materi yang dipelajari, khususnya kesetimbangan kimia. Peserta didik merasa yakin dengan hasil diskusi kelompok untuk menampilkan atau mempresentasikan hasil karya mereka di kelas. Selanjutnya, guru membantu peserta didik untuk menganalisis dan menyimpulkan materi yang baru saja dipelajari. Guru juga perlu memberikan waktu yang efektif dan efisien selama pembelajaran karena peserta didik menantikan untuk belajar lebih banyak tentang kimia.

Analisis faktor kemauan mengikuti pembelajaran kimia menunjukkan bahwa peserta didik memiliki sikap positif terhadap kimia. Respons positif peserta didik ditunjukkan pada pernyataan "Saya tidak pernah mencatat yang dijelaskan oleh guru selama mengikuti pembelajaran kimia" baik pada kelas eksperimen (M=3,55; SD=0,57) maupun pada kelas kontrol (M=2,90; SD=0,84). Peserta didik kurang setuju dengan pernyataan tersebut seperti yang ditunjukkan pada Tabel 6. Hal ini menunjukkan bahwa peserta didik akan mencatat materi yang disampaikan oleh guru.

Respons positif selanjutnya untuk kelas eksperimen adalah "Saya malas mengikuti diskusi kelompok yang dilakukan selama pembelajaran topik kesetimbangan kimia" (M=3,17; SD=0,71). Kelas PBL dituntut untuk dapat melakukan diskusi kelompok sehingga mereka dapat menemukan konsep dari topik kesetimbangan melalui kegiatan kolaborasi. Aspek ini menjadi sangat penting karena setiap peserta didik akan terlibat dan memiliki peran dalam proses pembelajaran sehingga pembelajaran menjadi lebih bermakna. Respons positif selanjutnya

Tabel 6
Analisis Faktor Kemauan Mengikuti Pembelajaran Kimia

No	Kemauan Mengikuti Pembelajaran Kimia	*Mean*	
		Eksperimen (S.D)	Kontrol (S.D)
1	Saya berusaha untuk hadir tepat waktu pada jam pembelajaran topik kesetimbangan kimia.	3,07 (0,65)	2,67 (0,84)
2	Saya berusaha untuk tidak meninggalkan kelas ketika pembelajaran topik kesetimbangan kimia berlangsung.	3,03 (0,82)	2,77 (0,86)
3	Saya malas mengikuti diskusi kelompok yang dilakukan selama pembelajaran topik kesetimbangan kimia.*	3,17 (0,71)	2,63 (0,81)
4	Saya senang berdiskusi dengan teman tentang topik kesetimbangan kimia.	2,86 (0,64)	2,53 (0,78)
5	Saya lebih suka mengobrol dengan teman daripada mendengarkan penjelasan tentang topik kesetimbangan kimia.*	2,97 (0,91)	2,70 (0,95)
6	Saya tidak pernah mencatat yang dijelaskan oleh guru selama mengikuti pembelajaran kimia.*	3,55 (0,57)	2,90 (0,84)

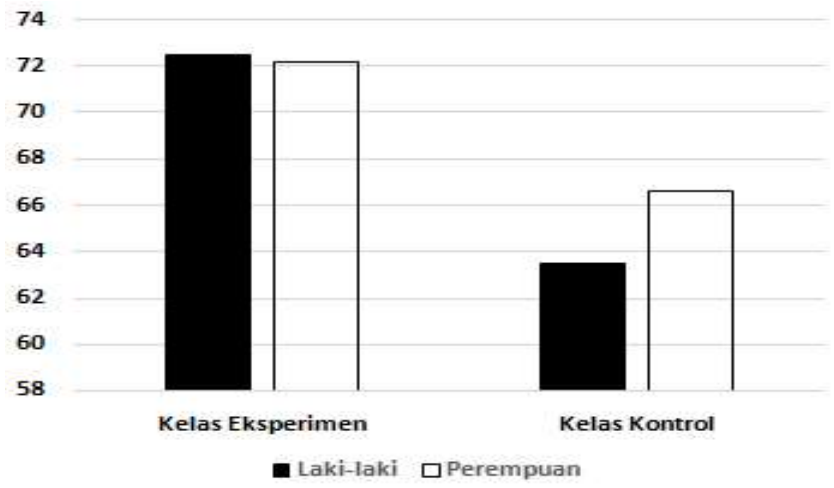
Ket: *Pernyataan negatif

untuk kelas kontrol adalah "Saya berusaha untuk tidak meninggalkan kelas ketika pembelajaran topik kesetimbangan kimia berlangsung" (*M*=2,77; *SD*=0,86). Peserta didik memiliki kemauan untuk mengikuti pembelajaran kimia dan berusaha untuk tetap berada di dalam kelas.

Jenis kelamin juga merupakan faktor yang berperan dalam minat belajar peserta didik (Krapp & Prenzel, 2011). Penelitian ini menunjukkan bahwa peserta didik laki-laki (72,50) lebih tertarik pada kimia daripada peserta didik perempuan (72,17) di kelas eksperimen. Kelas kontrol menunjukkan bahwa peserta didik perempuan (66,58) lebih tertarik pada kimia daripada peserta didik laki-laki (63,52). Secara keseluruhan, hasil yang diperoleh adalah peserta didik laki-laki (69,13) lebih tertarik pada kimia daripada peserta didik perempuan (68,98). Krapp dan Prenzel (2011) menyatakan bahwa kimia adalah bidang subjek yang kurang diminati oleh anak perempuan dibandingkan anak laki-laki. Sejumlah penelitian sebelumnya menunjukkan bahwa peserta didik laki-laki lebih tertarik pada kimia daripada peserta didik perempuan (Baram-Tsabari & Yarden, 2005). Sebaran kategori minat belajar peserta didik berdasarkan jenis kelamin ditunjukkan pada Gambar 2.

Minat peserta didik terhadap kimia masih rendah. Kimia dianggap sebagian besar peserta didik menjadi mata pelajaran yang sulit untuk dipahami. Salta dan Tzougraki (2004) menjelaskan bahwa selain kesulitan yang dimiliki peserta didik dalam memahami dan menerapkan konsep kimia, mereka juga mengalami kesulitan dalam memecahkan masalah kimia. Berbagai upaya harus dilakukan oleh guru agar suasana pembelajaran menjadi lebih menarik, inovatif, dan berorientasi

Gambar 2. Sebaran Kategori Minat Belajar Peserta Didik Berdasarkan Jenis Kelamin



pada peserta didik. Cara potensial untuk meningkatkan minat peserta didik pada kimia adalah dengan menggunakan konteks sosial dan kehidupan nyata sebagai titik awal pengembangan ide-ide ilmiah (Bennet, Lubben, & Hogarth, 2007). Penggunaan skenario yang diterapkan dalam model PBL dimaksudkan untuk meningkatkan minat peserta didik dalam kimia.

SIMPULAN

Terdapat perbedaan signifikansi minat belajar antara peserta didik yang menerapkan model pembelajaran PBL dan model pembelajaran ekspositori pada materi kesetimbangan kimia. Minat peserta didik dominan pada `kategori cukup baik di kelas eksperimen maupun di kelas kontrol. Minat peserta didik dalam kimia tidak tinggi. Peran guru merupakan faktor penting dalam mengembangkan minat peserta didik. Guru kimia sebagai fasilitator diharapkan mampu mengembangkan minat peserta didik melalui proses belajar mengajar yang berorientasi pada peserta didik dan menghubungkan materi dengan kehidupan nyata. Peserta didik juga perlu mengembangkan minat belajar kimia dengan meningkatkan rasa ingin tahu, menciptakan suasana kelas, dan memiliki kemauan yang tinggi untuk mengikuti pembelajaran kimia.

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THE EFFECT OF LANGUAGE LEARNING STRATEGY AND USE OF TECHNOLOGY TO STUDENTS' WRITING SKILLS

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Abstract

This study aims to find relationship between students' use of language learning strategies and technology to their writing performance. This study sought to find whether there is an influence of students' language learning strategies to their writing skills, students' technology use to the writing skills, and the combination of both to the writing skills. This study was quantitative research. The respondents were 459 high school students from six high schools. The students were 11 grade students in the first semester. The study employed Strategy Inventory Language Learning questionnaire developed by Oxford, students' technology use questionnaire, and a writing test to collect the quantitative data. The instruments were through experts to ensure the validity and reliability. The quantitative data were analyzed using SPSS to look for the regression value between variables. Findings suggest that both language learning strategies and students' technology use significantly influence the students' writing performance. Moreover, language learning strategies as well as technology use, when analyzed separately, positively influence students' writing performance. The findings confirm that including and promoting both language learning strategies and technology use could help student improve their writing performance in the classroom.

Keywords: *language learning strategy, tecnology use, writing skills*

INTRODUCTION

Language Learning Strategies (LLS) have attracted great interest of many researchers in the language teaching area for decades. They are known as a factor influencing the success of learning a language. Students who are able to use effective language learning strategies in their learning are likely to be successful (Oxford, 2008). Having abilities to employ language learning strategies helps language learners to enhance their learning and acquire the form and function which they need in order to communicate effectively in a second or foreign language (Zeynali, 2012). It helps them to take control of their mental, behavior, social to support their learning. Students who use a strategy usually become more efficient and more confident as the strategy acts as a tool for active, self-directed involvement. The more strategies that students use are highly related to the success of their proficiency in learning a language (Ardasheva & Tretter, 2013).

Language learning strategy is usually defined as an action or behavior done by learners to help them acquire, learn, perform, or retrieve knowledge so as to make learning more effective, enjoyable, and faster (Oxford, 2016). It also enables students to be more autonomous and confident. Thus, language learning strategies in the end leads to higher achievement if it is implemented appropriately in the classroom. Many studies prove that learners who employ strategies tend to get better achievements. A study suggests that the students' awareness

of implementing strategies leads to positive contributions in their speaking skills (Nakatani, 2010). After training students with strategy, their speaking skills improve significantly. These findings prove that language learning strategies contribute to students' achievement (De Silva, 2015).

In addition, some students might not recognize and are not able to use language learning strategies at all. Meanwhile, some students who recognize language learning strategies often use them ineffectively. In turn, some researchers believe that language learning strategies play little to no part in students' language development (Su, 2018). Language learning across the world had found that South African learners do not know that language learning strategies exist and it is quite contrary to the rest of the world who has been trying to develop language learning strategies for decades. This fact cannot simply conclude that the African students do not use learning strategies at all but they may not be aware of their existence yet. Despite all the debates regarding the effect of learning strategies on students' performance in the classroom, I argue that language learning strategies are still a crucial factor for determining students' success as strategies influence students' performance (Oxford *et al*., 2014).

Technology now has become a large part of education that also shapes language teaching learning in the classroom. For example, through the internet, students gain access to authentic L2 material, to a virtual immersion classroom through a video call and to a web where they can express their voice, self-image and legitimize their goal (Blake, 2013). Technology can be beneficial for students as it eases students' work like composing work, finding material, having communication with peers or teachers, and even creating native-like environments. In addition, using technology inside the classroom can motivate students. It is pointed out that using technology in the classroom fostered the development of attitudes. These potentials have great opportunities to enhance the teaching and learning process both inside and outside of the classroom (Drigas & Charami, 2014).

Technology creates opportunities for students to actively involve and to be treated equally in language learning activities. Thus, teachers need to be able to implement it in the classroom (Erben, Ban, & Castaneda, 2009). Students' motivational beliefs and their choices of learning strategies affect their preferences on the kind of classrooms they are comfortable to be in. Teachers aimed to find the students' motivational beliefs and choices of learning strategies when the online learning environment is lacking (Clayton, Blumberg, & Auld, 2010). Learning strategies are, therefore, associate to self-regulated learning which covers both metacognitive and cognitive strategies. They found that learners tended to choose traditional learning when they could not fully engage in an online course as the traditional course offered more instructional strategies usage and accommodate learning styles. Therefore, it implies that the availability of technology would affect the students' use of strategies. However, students' uses of technology are influenced by their competences and affordances of technology around them (Egbert, 2018). In turn, students do not share the same ability to use technology even if they have the same devices or available technology between them. Further, sometimes students know that particular technology can be used to support their learning but they decide not to use it for the sake of learning (Bikowski & Casal, 2018). In addition, technology also comes with some consideration despite its ability to enhance learning. Both

students and teachers have to make use of it effectively. It demands them to learn how to use the technology first before they want to implement it in the teaching and learning process. It has been pointed out that learners should have been given opportunities to develop and apply their ability to use ICT by utilizing ICT to boost their learning and to seek out various learning sources (Adams & Brindley, 2007).

Although technology comes along with its opportunities to enhance learning, technology also comes with challenges. Even if it is widely spread among schools, students or teachers, technology might not reach all students due to, for example, poverty in which students could not afford a smartphone, a computer device, or even internet access. Students should have a positive value of technology toward learning, experiences in using the devices, familiarity, and self-efficacy as all these factors influence the successful use of technology in classrooms (Rahimi & Katal, 2012). Moreover, even though they are familiar with it, sometimes the teacher needs to introduce and provide students with the new technology. The more important thing is how the students can make use of technology to enhance their learning. Sometimes, students are able to use technology but to make it able to enhance the teaching learning is still a challenge and it needs the teacher to introduce ways of thinking and strategies to students. Therefore, one student to other students might use technology differently as the students may face those challenges.

Previous research has investigated the underlying relationship between technology use in the classroom with the learning strategies (Rahimi & Katal, 2012; Saks & Leijen, 2014; de Andrés Martinez, 2012). Studies showed how distance learning or technology-enhanced learning affected students' use of metacognition strategies. He found that the students' metacognition skills improved along with the use of reflection and learning from their level of awareness. In the same idea, they found out the use of technology in the classroom activates students' learning strategies especially cognitive strategies. They believed technology could enhance metacognitive strategies and self-regulation. However, those studies did not portray possible learning strategies the students might use other strategies aside from the metacognitive strategy. Thus, this current study explored the effect of the other language learning strategies and the use of technology to support students' writing skills.

Learners in the traditional classroom may not have as many opportunities as their counterparts (Oxford & Lin, 2011). Technology offers many advantages to language learning learners. However, to optimally utilize technology, language learners need to have and to employ appropriate learning strategies. Language learners in Indonesia, despite their affordances of technology around them, still might not purposefully use technology to support their language learning. Thus, it is crucial to explore how language learners utilize technology in their surroundings for their learning.

METHOD

This study was quantitative. The quantitative data were gathered through a survey employing a questionnaire. The survey was suitable for this research as it aimed to gather numerous participants' responses and to generalize the data. Three types of data were gathered for this study such as students' language learning strategies, students' use of technology and students' writing ability. As it sought for

relations between the data, the students' language learning strategies and use of technology were the independent variables while the students' writing abilities were the dependent variables. Three instruments were used to gather each data and, after that, the data were statistically inferred. The research was conducted in six senior high schools in the Special Territory of Yogyakarta.

The questionnaire employed to get the quantitative data was in the form of students' responses. Meanwhile, the test was used to take students' scores on writing. Different questionnaires were used for each variable. For the questionnaire for language learning strategies, the Likert Scale model and the items within the questionnaire were developed and constructed based on *Strategy Inventory Language Learning* (SILL). SILL version 7 (Oxford, 1993) was used to assess students' language learning strategies. The SILL covered three types of learning strategies: metacognitive, cognitive and affective. The SILL, was then adapted to be 23 items for the questionnaire with an answer on a 4-point Likert Scale ranging from 1 (never true of me) to 4 (always true of me). As for the students' technology use, I developed the questionnaire items based on the literature review. The students' use of technology questionnaire was designed based on the TESOL technology standard framework (Hafner, 2013). TESOL technology standard framework was chosen due to its capabilities to provide sets of standards that draw students' technological knowledge and skills, a pattern of technology use and to provide course evaluation The quantitative data were analyzed by means of the SPSS sotfware. For the writing score, two inter-raters were employed. The first was the researcher himself and the other was the researcher's colleague. Students' writing scores were statistically and descriptively calculated. Then, the scores were included in the data from the language learning and technology questionnaire. Those data were analyzed to find out correlational statistics to yield a correlation value.

The students' language learning strategies were measured using a questionnaire based on Oxford's Strategy Inventory for Language Learning. It was adapted to suit students' conditions such as their first language and the questionnaire format. It consisted of 23 items with Likert scale choices starting from strongly disagree (1) to strongly agree (5). It was given to the students before the writing test because it did not need as much time as the writing test. The questionnaire's responses were submitted immediately after the students completed theirs. After all the students' responses were submitted, the researcher began to input and calculate the responses.

This study employed two regression techniques to find out the relationship between Language Learning Strategies, Technology' Use, and with Writing. Multiple Regression was used to look for the relationship between the two independent variables with the dependent variable. Table 1 indicates correlations between Language Learning Strategies (LLS) and Technology use to Writing Skills. The number shows that both LLS with r = .282, *Sig. = .000* and Technology use with r = *.224, Sig. = .000* significantly statistically correlate with Writing Skills.

FINDINGS AND DISCUSSION

Descriptive analysis was employed in this study to present the research findings in the form of descriptive statistic analysis. This analysis provides a hypothesis testing as a preliminary step in decision making and shows all the variables' Minimum Score, Maximum Score, Mean, Median,

Modus and Standard deviation which are packed into tables. In doing so, the Likert Scale from1 to 4 was employed. The data is presented in Table 1.

In gathering data for the writing skills, a writing test was employed. The instrument was a writing test that was constructed based on the students' current course in their first semester. The test item was an open-ended essay with predetermined topics. Students were asked to develop an essay based on the topic provided by the researcher within the given time. The topics, National Exam and The Use of Plastic Bag were chosen as the researcher thought that they were familiar topics for them.

After the students were given the test, their writings were collected and assessed by researchers. Here, the researcher employed a collaborator to assess the students' writing test to determine inter-rater reliability. A Writing Assessing rubric was also used to help the researcher determine their score. The collaborator involved in assessing the students' scores was also an English teacher who was not originated from the school where the data were taken. It was done to make sure that the assessment was valid. After the scores from the researcher and collaborator were collected, a statistical analysis of interrater reliability was conducted. The result of the analysis is described in Table 2.

Table 2 shows that the students' writing score is mostly between 61-80 intervals with a total of 246 students. Meanwhile, there are 184 students whose scores are between 41-60, 26 students in 81-100, and

Table 1
Descriptive Statistic of Students' LLS, Technology Use, and Writing Skills

Descriptive Analysis	Language Learning Strategies (X1)	Technology Use (X2)	Writing Skills (Y)
Respondent	452	452	452
Minimum	59.00	30.00	40.00
Maximum	235.00	92.00	93.00
Mean	151.4137	59.9845	63.8142
Median	152.0000	60.0000	63.0000
Modus	169.00	60.00(a)	58.00
Std. Deviation	23.10526	10.00985	8.95968
Variance	533.853	100.197	80.276

Table 2
Students' Writing Scores Distribution

No	Categories	Interval	Total (f)	Percentage (%)
1	Excellent	81 - 100	26	4.4
2	Good	61 - 80	246	54.4
3	Fair	41 - 60	184	40.7
4	Poor	21 - 40	2	0.4
5	Very Poor	0 - 20	0	0.0
	Total		452	100

2 students are in the 21-40 score interval. This distribution shows that most students are good enough or fairly good at writing. There are just a few of them who are really excellent or so poor in writing.

The calculation of students' Language Learning Strategies yieldeds a maximum score of 235, minimum score 59, mean 151.4137, median 152, modus 169, variance 533.853, and standard deviation 23.1052.

Table 3 indicates that 294 students, 65% of them, are into the fair category of language learning strategies use. They are no either good or bad strategies users. It means that the students might already use some categories to support their learning but they are not efficient enough in using those strategies. Meanwhile, the students who belong to the good categories are 19.5% and 0.2% for the very good category which is higher than the total number of students in the lower categories, 13.9% for the poor category, and 1.3 % for the very poor category. It indicates that more students are able to use language learning strategies compared to the students who use strategies poorly. However, the number of students who excellently employ strategies is only 0.2% which is less than those of very poor category students, 1.3%.

Students' technology use was measured using the questionnaire. There were 23 items for the questions and the students were provided with Likert Scale answers such as strongly disagree, disagree, agree, and strongly agree. The questionnaires were distributed after the students completed the language learning strategies questionnaire. Before each questionnaire, the researcher gave them an explanation about the purpose of the research as well as the item they should complete. After the students found that the explanation was clear, the questionnaire was distributed to them. Lastly, after they had done with the questionnaire, they submitted them to the researcher. The questionnaire's responses were then calculated to look for the initial score distribution. This was done by classifying their responses into some categories. The calculation of the students' technology use yielded the highest score 92, minimum score 30, mean score 59.9845, median 60, modus 60, variance 100.197 and standard deviation 10.00985. From these numbers, the following formula was used to determine the interval.

Table 4 indicates that the majority of the scores are 272 between 52-66 interval, 89 students between 67-80, 70 students between 28-51, 13 students between 81-92, 8 students between 23-37. from these numbers, it can be seen that most of the students are in the fair category which indicates that they are not that sophisticatedly use technology in their

Table 3
Students' Language Learning Strategies

No	Categories	Interval	Total (f)	Percentage (%)
1	Very Good	211 - 250	1	0.2
2	Good	171 - 210	88	19.5
3	Fair	131 - 170	294	65.0
4	Poor	91 - 130	63	13.9
5	Very Poor	50 - 90	6	1.3
	Total		452	100

Table 4
Students' Technology Use Score Distribution

No	Categories	Interval	Total (f)	Percentage (%)
1	Very Good	81 - 92	13	2.9
2	Good	67 - 80	89	19.7
3	Fair	52 - 66	272	60.2
4	Poor	38 - 51	70	15.5
5	Very Poor	23 - 37	8	1.8
	Total		452	100

surroundings. The table above shows that 60.2 % of the students belong to the fair category which indicates that most of the students are able to use technology although they do not fully utilize technology. The other 19.7% of the students are into the good category and 2.9% of them are in the very good category. On the other hand, 15.5% of students are in the poor category and 1.8% of them are in the very poor category. These numbers imply that more students are able to use technology compared to the students who could not use technology. However, most of the students are still in the fair category.

The normality test is done preliminary in the analysis to look at the data distribution. It is meant to show whether particular data are normally distributed or not. In this study, normality test employed was Kolmogorov-Smirnov Normality test with accepted Normality. Table 5 indicates that the Language Learning Strategy has Sig. value 0.343, Technology' Use has 0.095 and Writing has 0.055. Those three variables have Sig. value above 0.05, which indicates that they are all normally distributed data.

Students' language learning strategies are also related to their ability to perform language skills such as reading, listening, speaking and writing. In this study, the first hypothesis is to look for the relationship between students' language learning strategies and their writing abilities especially for students in Yogyakarta. This study discovers that Language Learning Strategies affect students' Writing Abilities as shown by R *0.282* with *Sig. 0.000.* It shows that Language Learning Strategies positively and significantly affects students' Writing Skills. The better the students' in using their strategies, the better they will be at writing.

The result of this study shows that there are positive and significant relationships between students' language learning strategies and writing skills. This finding is related to the study conducted by Mistar, Zuhairi, and Parlindungan (2014) who finds that students who employ strategies more have better writing abilities. Another

Table 5
Language Learning Strategy, Technology Use, and Writing Normality Test

Variable	Residual	Sig.	Interpretation
Language Learning Strategy	0.938	0.343	Normal
Technology' Use	1.235	0.095	Normal
Writing	1.341	0.055	Normal

finding has confirmed that language learning strategies improve students' writing abilities (Manham & Nejadansari, 2012). These findings show that language learning strategies affect students' writing abilities. Other studies about students' language learning strategies found that students' strategies use correlated with their language learning skills (Setyiadi, 2016). In Setyadi's study, the finding suggested that different language skills required different strategies. Based on the study, the writing skills were highly correlated with students' use of metacognitive strategies rather than cognitive strategies. The finding further strengthens the finding of this study which shows that students' learning strategies contributes to their writing performance. Similarly, a study by Raoofi, Binandeh, and Rahmani (2017) suggested that students' high writing skills were indicated by their high strategy use.

However, a study indicating contrastive results was conducted by Chand (2014). The study aimed to find a relationship between language learning strategies preference to students' abilities in writing academically. The study employed SILL questionnaire to 88 undergraduate students and for the students' writing, internet software called Markin was employed to assess their writing. The findings of this study suggested that students' strategy use did not bring significant impacts in their writing performance (Murray, 2010). This study employed SILL to 66 students while also assessing their proficiency. The finding suggested that there was just little correlation between language learning strategy use with students' proficiency.

Students who effectively use language learning strategies are most of the time students' who perform better in the classroom. By applying strategies, students could control, direct, and manage themselves to be better at learning. This will help students when they are facing writing tasks. Students' strategies in writing could come in many forms ranging from cognitive strategies up to affective strategies. Cognitive strategies are known for strategies related to writing tasks (Oxford, 2011). Cognitive strategies are used by students to manage their plans or ideas before and while they are writing. When these strategies are applied, students become more aware of their organization of the ideas and how the ideas will be presented in their writing and thus students could write better. Other strategies such as social strategies are also useful when students need to communicate and discuss with their peers about the ideas, grammar, vocabularies, or text organization.

The students thus could work together to solve problems on the task given to them, so they could write better through collaboration with their partners. In addition, students who apply metacognitive strategies also become aware of their writing purposes, the features of the writing they need to apply or strategies they need to write more effectively. Using strategies, students might monitor their progress, using their surrounding resources as materials to learn English, explore more vocabulary, improving grammar understanding which in the end the efforts lead to the development of the writing skill (Griffiths, 2008). In other words, students who can use effective language learning strategies can improve their competences and regulate themselves for their successful learning.

Learning with Technology means teaching learning in the classroom in empowering technology to support and facilitate learning. Technology use in the classroom is derived into developing and creating a learning system that involves some technologies to enhance the teaching

learning process (Blake, 2008). Technology now is such a familiar thing for students as they grow and live with it. Thus, if students carefully use technology, students can boost their learning. Moreover, the finding showing students' use of technology toward learning contributes to their writing skills is similar in her research of Blended Learning which shows that Blended Learning positively affects student's ability in writing. Implementation of Blended learning in the teaching learning enables students to be more flexible, motivated, oriented, and inspired. Blended learning which is famous for combining a traditional classroom with a technology-rich classroom means that purposefully and carefully implementation of technology in a classroom provides students with such benefits (Liu, 2013).

In the same manner, the availability of technology within the classroom greatly enhances the teaching learning process as in her classroom *Blended Learning* is employed and successfully boosts the teaching learning process (Sari, 2017). In addition, she emphasizes that through technology students have opportunities to share ideas, work with each other and apply numerous strategies so that they can work together on language issues. In other words, technology can be said to bridge students together and facilitate them together which leads to better language performances (Kost, 2011). Moreover, studied computer-cooperativeness influences in students' writing performance. This study implemented text-brainstorming, drawing and mind-mapping as the computer cooperative tools for the students. The findings of the study revealed that three computer cooperative tools help students improve their writing performance. These findings emphasize that when the students can use and have access to technology, their learning is enhanced (Lan, Sun, Cheng, & Chang, 2015).

Through technology, students open a way for them to improve and maximize their learning that in the end it leads to a better teaching learning process as a whole and especially for learning a language. The more students get the opportunity to not only understand but also to use the available technology around them, the more they can optimize their learning. Further, the technology which is available for the students might help them gathering information about learning materials such as grammar, vocabulary, or text organization.

In the time the students gather the information, they might be storing it in their gadget or computer and when they need the information, they can easily re-learn from it. With current conditions where the internet is most accessible, students might also use online grammar checker or built-in grammar checker in their computer to help them assess their writing. Other possibilities where technology can help students improve their writing are when the students can easily exchange information or work collaboratively. This opportunity helps students build their ideas and understanding about the task they are doing. Furthermore, students might also more motivated and excited when they are learning with technology. Students who are high in motivation and excitements perform better in the classroom.

Language Learning Strategies which are effectively used and employed by students are such crucial requirements for them if they want to be successful at learning. Good language learners are usually associated with learners who use learning strategies in their learning. Language Learning strategies are defined as manageable, conscious, and devoted

efforts students put to their learning so that they can learn a new language. Such synchronization of effective use of learning strategies and learning steps promotes successful teaching learning (Ferris, 2012). Moreover, language learning strategies are not only prominent factors in the classroom, another factor such as students' technology use also might influence students' learning. Through technology, students now have access to much information and learning materials that comes in various kinds of forms such as video, text, picture, and audio. The availability of technology not only helps students find learning materials but also helps them manage them, to make it more interesting. Students will be more active and interested in teaching learning if they are given contributions to choose learnings materials they need to learn (Becker, Rodriguez, Estrada, Davis, 2016).

This study has shown that the correlation value of language learning strategies and the use of technology have a positive relationship with students' writing abilities. This finding suggest that learners who are great at writing are the ones who employ learning strategies as indicated in several studies confirming the positive effects of language learning strategies to students' writing abilities (Mistar *et al*., 2014).

Teaching learning should be altered and adapted to current changes for example language learning strategies available in the realm of advancing technology in the classroom. English especially is needed now as the emerging of technology and information is delivered in English (Mutlu & Eroz-Tuga, 2013). Appropriate usage of technology in the classroom promotes improvements in students' learning. The findings above emphasize that technology should be promoted along with the use of appropriate language learning strategies in the classroom as they offer enormous benefits for students and their learning.

This study aimed to explore the relationship between language learning strategies and student use of technology toward their writing abilities. However, in this study, the researcher met some inevitable obstacles especially in students' available time to do the writing task. The schools allocated different periods for the researcher to collect the data as the teachers had their schedule and the students needed to prepare for the upcoming mid-term test. Some of them needed to catch up with the learning material thus the researcher just had a limited time to collect the data especially for the students' writing test. As a result, some students got the least amount of time possible to do the writing test. This condition might hinder the students to produce the best writing possible so that the score might not reflect the true nature of the students' writing competencies.

CONCLUSION

Language learning strategies have a significant and positive relationship with students' writing abilities. This research further proves that developing students' effective use of language learning strategies help them learn better at developing language skills. This finding provides further support to previous studies that show the contribution of language learning strategies to better language learning performance. This study proves that Technology Use has a significant and positive relationship with students' writing abilities. Students who use technology for their learning performs better in the classroom. This finding confirms that the availability of technology followed by students' use contributes to the teaching learning process in the classroom. Language learning strategies and technology use have

a significant and positive relationship with students' writing abilities. Both language learning strategies and students' technology use can contribute to their performance in the classroom.

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PENGEMBANGAN KAMUS PERBAIKAN BODI OTOMOTIF BERBASIS ANDROID UNTUK SISWA SEKOLAH MENENGAH KEJURUAN

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Abstrak

Tujuan penelitian ini adalah untuk menghasilkan kamus perbaikan bodi otomotif berbasis *android* yang layak dan efektif untuk penguasaan istilah asing *autobody repair* pada bahan ajaruntuk siswa sekolah menengah kejuruan (SMK). Penelitian pengembangan ini mengacu pada model Borg and Gall. Subjek penelitian adalah siswa SMK Kompetensi Keahlian Teknik Perbaikan Bodi Otomotif sebanyak 3 siswa untuk tahap uji coba lapangan awal, 6 siswa untuk uji coba lapangan utama dan 20 siswa untuk tahap uji coba lapangan operasional. Penilaian kelayakan produk berdasarkan penilaian ahli materi, ahli media, dan penilaian guru. Validasi instrumen ini melibatkan ahli pembelajaran teknik otomotif di sekolah kejuruan. Aspek penilaian kelayakan meliputi aspek kebenaran, keluasan, teori, format, dan konten. Hasil penelitian ini menunjukkan bahwa Kamus Perbaikan Bodi Otomotif berbasis *android* layak digunakan sebagai sumber belajar pada materi penguasaan istilah asing *autobody repair* untuk siswa SMK. Kamus yang dikembangkan efektif untuk meningkatkan pemahaman siswa terhadap istilah asing dengan peningkatan dalam kategori sedang. Penggunaan teknologi mendukung peningkatan proses dan kualitas pembelajaran di SMK.
Kata kunci: *kamus, perbaikan bodi otomotif, android, penguasaan istilah*

DEVELOPING AUTOBODY REPAIR DICTIONARY BASED ON ANDROID FOR VOCATIONAL STUDENTS

Abstract

The purpose of this study was to develop an android-based automotive body repair dictionary that is feasible and effective for mastering foreign terms autobody repair in teaching materials for vocational high school students. This development research refers to the Borg and Gall model. The research subjects were 3 students of Vocational High School for Automotive Body Repair Engineering Skills, as many as 3 students for the initial field trial phase, 6 students for the main field trial and 20 students for the operational field trial. The assessment of product feasibility based on the assessment of material experts, media experts, and teacher. The validation of this instrument involves learning experts in automotive engineering in vocational schools. The aspects of the feasibility assessment include aspects of validity, aspects of breadth, aspects of theory, aspects of format and aspects of content. The results of this study indicate that the Android-based Automotive Body Repair Dictionary is appropriate for use as a learning resource on mastering foreign terms related to autobody repair for vocational students. The dictionary developed is effective to improve students' understanding of foreign terms with an increase in the medium category. The use of technology supports the improvement of the learning process and quality in vocational level.
Keywords*: dictionary, automotive body repair, android, term mastery*

PENDAHULUAN

Kebutuhan industri terhadap lulusan Sekolah Menengah Kejuruan (SMK) perlu dipersiapkan dengan sebaik-baiknya melalui proses pembelajaran dan pendidikan yang baik. Tujuan dari Pendidikan Kejuruan telah tercantum pada Undang-Undang Sistem Pendidikan Nasional (UUSPN) Nomor 20 Tahun 2003 pasal 15 yang menyatakan bahwa pendidikan menengah kejuruan memiliki tujuan dalam mempersiapkan siswanya untuk bekerja pada bidang-bidang tertentu (Depdiknas, 2003). Pendidikan diharapkan dapat mempersiapkan sumber daya manusianya untuk memiliki kemampuan berkomunikasi, menguasai ilmu pengetahuan dan teknologi (Yamtinah, Roemintoyo, & Kartikasari, 2020). Hal ini diperkuat dengan pendapat yang disampaikan oleh Saputra dan Sukirno (2020) yang menyatakan bahwa siswa SMK perlu memiliki kesiapan kerja sebelum memasuki dunia kerja, baik siap secara afektif, kognitif dan psikomotorik. Siswa SMK hendaknya memiliki daya saing yang tinggi sebelum nantinya masuk ke dunia industri. Kemampuan siswa SMK untuk dapat bertahan dan berkembang di dunia industri salah satunya adalah kemampuan penyesuaian diri siswa terhadap perkembangan ilmu dan teknologi (Nugraha & Wahyono, 2019)

Sejalan dengan kebutuhan industri *Autobody Repair* terhadap SDM yang berkualitas secara tidak langsung menuntut lulusan dari SMK kompetensi keahlian Teknik Perbaikan Bodi Otomotif untuk memiliki kompetensi sesuai dengan kebutuhan industri. Profil lulusan dunia industri yang bergerak di bidang *Autobody Repair* dan tingkat relevasinya dengan dunia pendidikan diketahui bahwa pengetahuan serta penguasaan komponen kendaraan sebelum melaksanakan perbaikan kendaraan menjadi dasar yang harus dikuasai oleh setiap lulusan (Yudantoko & Arifin, 2016). Penguasaan dan pemahaman terhadap istilah-istilah komponen, prosedur hingga perawatan komponen menjadi hal yang sangat penting ketika nantinya terjun dalam dunia industri *Autobody Repair,* karena kesalahan sedikit saja menyebabkan terjadinya miskonsepsi makna yang ingin disampaikan.

Tujuan pembelajaran dan efektivitas pelaksanaan kegiatan pembelajaran perbaik-an bodi otomotif di SMK dapat tercapai dengan baik tidak terlepas dari proses yang dilaksanakan dan sumber belajar yang digunakan. Namun demikian, terdapat beberapa hal yang menjadi kendala dan permasalahan dalam proses pembelajaran sehingga berpengaruh terhadap penguasaan materi oleh siswa. Kurangnya pemahaman siswa terkait istilah-istilah asing ini dikarenakan karakteristik materi yang melibatkan ingatan sehingga perlu pengulangan dalam menguasainya. Penggunaan buku pegangan dalam menyelesaikan job praktik, mengharuskan siswa membuka buku satu persatu untuk menyelesaikan permasalahan yang terdapat pada bahan ajar. Penguasaan bahan ajar menjadi hal yang sangat penting karena pemahaman terhadap suatu bahan ajar menjadi indikator sebuah keberhasilan dalam proses pembelajaran (Kristiyani, 2020).

Di sisi lain, siswa memiliki kecenderungan malas untuk membawa dan membaca buku yang banyak dan tebal. Siswa era saat ini yang merupakan anak-anak generasi *digital native* lebih memilih *browsing* dengan menggunakan *handphone* ataupun laptop untuk menyelesaikan masalah yang dihadapi (Widyatmojo & Muhtadi, 2017). Generasi *digital native* merupakan generasi yang lahir dan hidup di lingkungan *digital* sehingga telah mengenal komputer, internet, *handphone*, dan *video*

game (Prensky, 2001). Dwiningsih, Sukarmin, Muchlis, dan Rahma (2018) juga menjelaskan bahwa generasi *digital native* atau sering disebut juga sebagai generasi Z merupakan generasi yang memiliki kemampuan dan keunggulan dalam pemanfaatan teknologi sebagai informasi dan komunikasi.

Permasalahan penguasaan siswa terhadap istilah-istilah asing salah satunya didukung oleh data hasil belajar aspek kognitif yang belum mencapai SKM (Skor Ketuntasan Minimum). Hasil belajar ini perlu diperbaiki selain agar memenuhi standar SKM tetapi juga untuk menunjukan tingkat penguasaan siswa terhadap materi yang diajarkan dalam proses pembelajaran. Seperti dikemukakan oleh Hamalik (Tohari, Mustaji, & Bahri, 2019) bahwa hasil belajar merupakan sebuah indikator bertambahnya pengetahuan dan kompetensi melalui perubahan persepsi dan tingkah laku yang dimiliki oleh seseorang. Hasil belajar tergantung dari yang telah diketahui sebelumnya oleh siswa seperti konsep-konsep, tujuan, dan motivasi yang dipengaruhi interaksi secara terus menerus dengan bahan *(resources)* yang dipelajari. Hal ini menunjukan bahwa hasil belajar merupakan sebuah penilaian akhir terhadap proses dan pengenalan yang sudah dilakukan oleh seseorang secara berulang-ulang. Berdasarkan hal tersebut, potensi yang dapat digunakan sebagai solusi adalah dengan memberikan stimulus dan pengalaman belajar baru terhadap siswa yang terus melekat pada diri siswa. Hal ini didukung oleh pendapat dari Sudjana (2006, p. 22) yang menyatakan bahwa hasil belajar akan terus melekat pada diri siswa karena secara tidak langsung sudah menjadi bagian yang tidak terpisahkan pada kehidupan siswa yang belajar.

Potensi lain adalah pemanfaatan *handphone* sebagai sumber belajar. Kecenderungan siswa generasi *digital native* lebih memilih untuk *browsing* dibandingkan dengan membaca buku. Pemanfaatan *handphone* ini didukung oleh jumlah kepemilikan *handphone* yang dimiliki hampir oleh seluruh siswa. Data tersebut diperkuat oleh pendapat Gifary dan Kurnia (2015) yang menyatakan bahwa Indonesia menduduki peringkat kelima daftar pengguna *smartphone* terbesar di dunia dimana populasi pengguna *smartphone* jenis *Android* mencapai lebih dari 1 miliar. Menurut Horwitz mengacu pada data dari wearesocial.sg menunjukan bahwa 112% penduduk di Indonesia menggunakan *mobile device* dengan jenis sistem operasi sebagian besarnya adalah sistem operasi *Android* (Triluqman, Mulyoto, & Sutimin, 2018). Jumlah daftar pengguna *smartphone* di Indonesia tersebut didukung oleh penelitian dari Kementrian Informasi bersama dengan UNICEF yang mengelompokan kategori pengguna *smartphone* pada usia anak-anak dan remaja di Indonesia mencapai 79,5% (Heni & Mujahid, 2018). Jumlah pengguna *smartphone* berdasarkan tingkat pendidikan, hasil penelitian dari Puslitbang Aptika IKP Kominfo menunjukan 40,87% pengguna SD; 59,89% pengguna SMP; dan 79,56% pengguna SMA. Persentase pengguna untuk tingkat pendidikan SMA termasuk di dalamnya Sekolah Menengah Kejuruan memiliki persentase yang paling besar. *Smartphone berplatfrom Android* masih menjadi favorit karena memiliki sistem operasi *Android* yang bersifat *open source*. *Android* didefinisikan sebagai sebuah sistem operasi yang didesain secara *open source* yang dapat diunduh secara lengkap untuk perangkat seluler yang dilengkapi dengan sistem operasi, *middleware*, dan aplikasi utama berbasis Linux dan Java (Khanna, 2016).

Smartphone menjadi sebuah *platfrom* yang berpotensi untuk dikembangkan secara khusus menjadi salah satu sumber belajar dalam mengatasi masalah belajar. Pengembangan terhadap potensi sumber belajar *(resources)* menurut AECT dikelompokkan menjadi dua yaitu *by design* dan *by utilization*. Sumber belajar *by design* merupakan sumber belajar yang didesain dan dirancang secara khusus sebagai komponen sistem instruksional dalam memfasilitasi belajar yang bersifat formal, serta memiliki tujuan tertentu dan terarah. Sedangkan sumber belajar *by utilization* adalah sumber belajar yang tidak didesain secara khusus untuk kegiatan pembelajaran namun dapat dimanfaatkan untuk belajar (Maswan & Muslimin, 2017, p. 30).

Berdasarkan permasalahan dan potensi dari proses pembelajaran teknik perbaikan bodi otomotif, maka perlu adanya pengembangan *resources by design* yang tidak tercetak dengan tampilan menarik yang dapat digunakan dan dimanfaatkan oleh siswa pada kapan saja dan dimana saja. *Resources* yang tepat untuk memfasilitasi hal tersebut adalah *dictionary* (kamus) berbasis *Android*. *Dictionary* berbasis *Android* merupakan *electronic dictionary* yang berfungsi untuk memfasilitasi siswa dalam menguasai dan memahami istilah-istilah baru melalui perangkat *handphone* berbasis *Android*. *Dictionary* berbasis *Android* memungkinkan dan mendukung siswa untuk melakukan proses belajar secara berulang-ulang dimana saja, kapan saja secara mandiri.

Penggunaan *dictionary* yang berulang-ulang akan berdampak pada penguasaan terhadap suatu istilah, dengan demikian maka pengembangan *resources dictionary* berbasis *Android* merupakan sebuah solusi yang tepat dalam memfasilitasi siswa menguasai istilah-istilah pada *Autobody Repair*. Hal ini sangat sesuai dengan definisi teknologi pendidikan menurut AECT 2008 yaitu studi dan etika praktik untuk memfasilitasi pembelajaran serta meningkatkan kinerja dengan cara menciptakan, menggunakan, dan mengelola proses dan sumber daya teknologi yang tepat (Januszewski, & Molenda, 2008, p. 1).

Penggunaan *resources dictionary* dalam mendukung penguasaan istilah-istilah dan penguasaan kosakata didukung oleh penelitian yang dilakukan oleh Amirian dan Heshmatifar (2013) terkait *The Impact of Using Electronic Dictionary on Vocabulary Learning and Retention of Iranian EFL Learners* terhadap 134 siswa di Iran yang menunjukan bahwa *electronic dictionary* merupakan alat pembelajaran yang efektif dalam meningkatkan penguasaan kosakata. Penelitian lain yang mendukung pengembangan ini dilakukan oleh Toghyani dan Salehi (2016) terkait *Impact of Using Electronic Dictionary on Collocation Learning and Retention of Iranian EFL Learners* dengan melakukan eksperimen pada 340 siswa dari 6 lembaga bahasa di Iran menunjukan hasil bahwa kelompok eksperimen menggunakan *electronic dictionary* secara signifikan memperoleh hasil belajar yang lebih baik dibandingkan dengan kelas kontrol.

Berdasarkan latar belakang yang telah dijabarkan sebelumnya, maka diperlukan pengembangan Kamus Perbaikan Bodi otomotif berbasis *Android* untuk penguasaan istilah asing *Autobody Repair* Pada Bahan Ajar Teknik Perbaikan Bodi Otomotif. Adapun tujuan penelitian ini adalah untuk mengetahui kelayakan dan keefektifan Kamus Perbaikan Bodi Otomotif berbasis *android* untuk penguasaan istilah asing *Autobody repair* pada bahan ajar teknik perbaikan bodi otomotif.

METODE

Penelitian *Research and Development* dilaksanakan pada Tahun Ajaran 2018/2019 dengan subjek penelitian adalah Siswa kelas XI pada Kompetensi Keahlian Teknik Perbaikan Bodi Otomotif di SMK N 2 Depok Sleman. Prosedur pengembangan yang dilakukan dalam penelitian ini menggunakan model pengembangan Borg dan Gall. Terdapat 10 langkah menurut Borg dan Gall di antaranya adalah *research and information collecting, planning, develop preliminary form of product, preliminary field testing, main product revision, main field testing, operational product revision, operational field testing, final product revision, dissemination & implementation.* Berikut ini adalah tahapan-tahapan yang dilakukan sesuai dengan model pengembangan Borg dan Gall (Mulyatiningsih, 2013, p. 163).

Pada tahapan *research and information collecting* merupakan kegiatan analisis awal terhadap kondisi pembelajaran di sekolah, karakteristik siswa, kemampuan awal siswa, tujuan dan kompetensi dasar yang dicapai oleh siswa. Tahapan selanjutnya adalah *planning*, tahapan ini meliputi pengumpulan berbagai referensi terkait pengembangan media, bahan ajar teknik perbaikan bodi otomotif. Pada tahapan ini juga dilakukan perumusan tujuan penyusunan media dan pendekatan yang digunakan dalam pengembangan media serta pengembangan *storyboard*.

Tahapan *develop preliminary form of product* merupakan pengembangan produk awal sesuai dengan desain perancangan desain yang telah disusun pada *storyboard* hingga menghasilkan produk awal aplikasi *Kamus Perbaikan Bodi Otomotif* berbasis *Android.* Pada tahapan ini pula dilakukan validasi terhadap rancangan produk oleh ahli media dan ahli materi, hal ini dilakukan guna mengetahui kelayakan dari rancangan produk yang dikembangkan dari berbagai aspek yaitu aspek media dan aspek materi.

Tahapan *preliminary field testing* merupakan uji coba lapangan awal. Uji coba ini dilakukan dalam skala kecil dengan melibatkan jumlah siswa yang terbatas yaitu 3 siswa yang dipilih secara acak. Selanjutnya siswa dipersilahkan untuk mengerjakan *pretest* yang berkaitan dengan materi perbaikan bodi otomotif dimana terdapat istilah-istilah asing mengenai *body repair*. Setelah melaksanakan *pretest* siswa diberikan perlakuan dengan menggunakan produk yang telah dikembangkan sebagai media belajar. Kemudian setelah adanya perlakuan siswa dipersilahkan untuk mengerjakan *posttest* dan mengisi angket respons siswa yang telah disediakan peneliti. Tahapan selanjutnya setelah mengetahui hasil dari uji coba lapangan awal adalah *main product revision.* Tahapan ini merupakan revisi awal berdasarkan hasil analisis yang dilakukan dari uji coba lapangan awal dan masukan yang diperoleh pada saat uji coba dilaksanakan.

Main field testing adalah tahapan uji lapangan utama. Pada tahapan ini melibatkan siswa kompetensi keahlian teknik perbaikan bodi otomotif dengan jumlah siswa yang lebih banyak dibandingkan sebelumnya, yaitu 6 siswa. Siswa tersebut dipilih secara acak untuk selanjutnya dilakukan tes kemampuan awal melalui *pretest*. Setelah *pretest* dilakukan, kemudian dilakukan perlakukan terhadap siswa tersebut dengan menggunakan media yang telah dikembangkan. Selanjutnya adalah melakukan *posttest* untuk mengetahui dampak terhadap perlakuan dan siswa diberikan angket respons siswa terhadap media yang dikembangkan. Tahapan selanjutnya adalah *operational product revision*, tahapan ini adalah melakukan perbaikan atau revisi berdasarkan hasil

uji coba lapangan utama yang telah dilaksanakan sebelumnya.

Operational field testing adalah uji coba lapangan operasional. Uji ini melibatkan 20 siswa kompetensi keahlian teknik perbaikan bodi otomotif. Hampir sama dengan tahapan sebelumnya, siswa dipersilahkan untuk mengerjakan *pretest* terlebih dahulu guna mengetahui kemampuan awal dari 20 siswa tesebut. Selanjutnya siswa diberikan perlakuan dengan memanfaatkan media yang dikembangkan oleh peneliti. Setelah diberikan perlakuan siswa kembali dipersilahkan untuk melaksanakan *posttest* dan diberikan angket respons siswa terhadap media yang dikembangkan sebagai pertimbangan untuk melakukan *final produk revision* dari media yang dikembangkan.

Final product revision merupakan revisi produk tahap akhir terhadap media yang dikembangkan berdasarkan hasil ujicoba sebelumnya. Setelah dilakukan revisi akhir untuk selanjutnya produk dilakukan proses *dissemination and implementation* terhadap media yang telah dikembangkan yaitu *Kamus Perbaikan Bodi Otomotif* berbasis *Android*.

Instrumen yang digunakan untuk menganalisis kelayakan produk divalidasi dulu sebelum digunakan. Validasi instrumen ini melibatkan ahli pembelajaran teknik otomotif di sekolah kejuruan. Aspek penilaian kelayakan meliputi aspek kebenaran, aspek keluasan, aspek teori, aspek format dan aspek konten dengan keseluruhan jumlah total indikator adalah 22 indikator penilaian. Berdasarkan hasil validasi instrumen pada tahap awal diketahui bahwa instrumen layak digunakan dengan revisi, kemudian peneliti melakukan perbaikan berdasarkan masukan yang diberikan oleh ahli untuk selanjutnya diajukan kembali dan diperoleh hasil bahwa instrumen penelitian layak digunakan untuk penelitian.

Data kelayakan terhadap media berupa data kualitatif dan kuantitatif. Data kualitatif adalah masukan dari validator dan reviewer/ guru yang dianalisis secara deskriptif melalui pengelompokkan saran dan masukan. Selanjutnya, hasil telaah terhadap saran dan masukan tersebut digunakan sebagai dasar untuk memperbaiki produk media. Adapun analisis terhadap kelayakan media yang dikembangkan didasarkan pada hasil penilaian oleh ahli materi, ahli media dan penilaian guru. Hasil skor kuantitatif yang diperoleh diubah ke dalam data interval kemudian dikonversikan menjadi data kualitatif dengan menggunakan skala 5. Skor rerata dari masing masing komponen dilakukan perhitungan dengan menggunakan rumus (1) yang dikemukakan oleh Usman dan Setyadi (2011).

$$\bar{X} = \frac{\Sigma x}{N} \quad (1)$$

Keterangan:
$\bar{X}$: Rerata Skor Tiap Komponen
Σx : Jumlah Skor
N : Jumlah Indikator yang dinilai

Data yang diperoleh diubah kedalam data kualitatif dengan menggunakan acuan konversi yang dikemukakan oleh Widoyoko (2009, p. 11) sebagai berikut.

Tabel 1
Konversi Skor Kuantitatif ke Kualitatif

Rentang	Kategori
$X > 3{,}4$	Sangat Layak (SL)
$2{,}8 < X \leq 3{,}4$	Layak (L)
$2{,}2 < X \leq 2{,}8$	Cukup (C)
$1{,}6 < X \leq 2{,}2$	Kurang Layak (KL)
$X \leq 1{,}6$	Sangat Kurang Layak (SKL)

Produk yang telah divalidasi kemudian diuji efektivitas di SMK N 2 Depok, Sleman

dengan melibatkan 29 siswa kelas XI Kompetensi Keahliah Teknik Perbaikan Bodi Otomotif. Uji coba efektivitas mencakup uji respons siswa dan eksperimen penggunaan media dalam pembelajaran. Uji respons siswa dilaksanakan melalui 2 tahapan uji yaitu uji coba lapangan awal dan uji coba lapangan utama. Adapun tahap eksperimen dilakukan sebagai dan uji coba lapangan operasional. Uji coba lapangan awal melibatkan 3 siswa yang dipilih secara random. Siswa dipersilahkan untuk menggunakan *resources* yang sebelumnya telah dilakukan validasi. Selanjutnya, dilaksanakan uji coba lapangan utama yang melibatkan 6 siswa teknik perbaikan otomotif yang dipilih secara acak dan dipersilahkan untuk menggunakan resources yang telah dikembangkan.

Setelah mengetahui respons siswa pada uji coba lapangan utama, selanjutnya dilaksanakan uji coba operasional yang melibatkan 20 siswa. Uji efektivitas pada tahap ini diukur berdasarkan peningkatan pemahaman siswa terhadap istilah-istilah asing yang berkaitan dengan *Body Repair* melalui *pretest-posttest* dengan menggunakan desain eksperimen *one group pretest-posttest design*. Adapun desain ujicoba *one group pretest-posttest design* sesuai dengan yang disampaikan oleh Handari dan Sugianto (2019) (Tabel 2).

Tabel 2
One Group Pretest-Posttest Design

Pengukuran *(Pretest)*	Perlakuan	Pengukuran *(Posttest)*
O_1	X	O_2

Peningkatan hasil belajar siswa terhadap penguasaan istilah-istilah asing yang berkaitan dengan *Body Repair* dihitung menggunakan pengujian n-*Gain* menurut Hake (Munif, Susanto, & Suslo, 2016) dengan rumus (2).

$$g = \frac{Spost - Spre}{Smaks - Spre} \quad (2)$$

Keterangan:
g : Skor *gain* yang dinormalisasi
Spost : Skor *Posttest*
Spre : Skor *Pretest*
S_{maks} : Skor Maksimal

Hasil dari tinggi rendahnya *gain* yang dinormalisasi *(N-gain)* kemudian diinterpretasikan ke dalam bentuk tabel nilai *gain* (Tabel 3).

Tabel 3
Kriteria n-Gain

Rentang Nilai	Kategori
(*N-gain*) ≥ 0,7	Tinggi
0,7 > (*N-gain*) ≥ 0,3	Sedang
(*N-gain*) < 0,3	Rendah

HASIL PENELITIAN DAN PEMBAHASAN

Penelitian pengembangan yang dilaksanakan bertujuan menghasilkan *resources* untuk penguasaan istilah-istilah asing pada bahan ajar *Autobody Repair* pada kompetensi keahlian Teknik Perbaikan Bodi Otomotif dan keefektifan dari produk *resources* yang dikembangkan. Pelaksanaan penelitian yang dilakukan terdiri dari serangkaian kegiatan yang tersusun secara sistematis sesuai dengan tahapan-tahapan model pengembangan menurut Borg and Gall.

Tahapan kegiatan awal yang dilaksanakan adalah analisis kebutuhan yang diperlukan sebelum melakukan perancangan sebuah *resources*. Analisis kebutuhan ini meliputi analisis terhadap karakteristik siswa, tujuan dan kompetensi yang hendak dicapai siswa, bahan ajar yang digunakan

siswa dan kemampuan awal siswa. Teknik dan instrumen yang digunakan dalam pengumpulan data ini menggunakan *non-test* dan *test*. *Non-test* dilaksanakan dengan menggunakan teknik observasi, angket dan wawancara sedangkan tes dilaksanakan untuk mengukur kemampuan awal siswa dan kemampuan setelah dilaksanakan perlakuan melalui *pretest* dan *posttest.*

Hasil tes kemampuan awal siswa Teknik Perbaikan Bodi Otomotif melalui *pretest* diketahui bahwa dari 29 siswa kelas XI, sebanyak 70% siswa belum memenuhi SKM (Skor Ketuntasan Minimum). Hal ini didukung oleh hasil wawancara kepada 10 siswa yang dipilih secara acak yang sebagian besar beranggapan pada materi yang diajarkan terdapat istilah-istilah yang belum sepenuhnya dikuasai dan dipahami sehingga menyulitkan untuk memahami materi yang sedang dipelajari. Pada saat guru memberikan kesempatan untuk bertanya diakui oleh beberapa siswa bahwa mereka merasa malu untuk bertanya, hal ini berdampak pada asumsi guru bahwa siswa sudah memahami materi tersebut ketika tidak ada yang bertanya. Selain itu, berdasarkan hasil observasi sumber belajar mandiri tercetak belum efektif dalam memberikan pemahaman terkait istilah-istilah yang terdapat dalam *Autobody Repair.* Hal ini diperkuat oleh perilaku siswa era saat ini yang tergolong sebagai anak-anak generasi *digital native* memilih *browsing* memilih menggunakan *handphone* ataupun laptop untuk menyelesaikan masalah yang dihadapi.

Fenomena *digital native* ini menjadi sebuah potensi dalam menyelesaikan permasalahan pembelajaran yang terjadi. Potensi ini adalah pemanfaatan *handphone* sebagai sumber belajar. Hal tersebut dapat dilihat dari penjelasan sebelumnya dimana kecenderungan siswa yang memilih untuk *browsing* menggunakan *handphone* atau *laptop* dibandingkan dengan membaca buku dalam menyelesaikan sebuah permasalahan dalam *Autobody Repair*. Potensi ini didukung oleh kepemilikan *handphone* siswa yang mana keseluruhan siswa kelas XI teknik perbaikan bodi otomotif yang berjumlah 29 siswa, seluruhnya (100%) memiliki *smartphone* dengan *platform* berbasis *Android*. Setelah diketahui potensi yang dapat dijadikan sebagai solusi pemecahan masalah, kemudian dilaksanakan pengembangan produk awal *resources*. Hasil dari pengembangan produk awal ini nantinya dilakukan validasi dan penilaian oleh ahli materi, ahli media dan penilaian oleh guru Teknik Perbaikan Bodi Otomotif.

Tahapan selanjutnya adalah pengembangan produk untuk menghasilkan produk awal *Auto Body Repair Dictionary* berbasis *Android.* Tahapan yang dilakukan diantaranya adalah adalah pembuatan *storyboard*, *selecting* data materi, pembuatan *database*, *input* data dan *output* data. Pembuatan *storyboard* merupakan *blueprint Auto Body Repair Dictionary* berbasis *Android* dan sebagai acuan awal untuk memproduksi sebuah produk. *Storyboard* berisikan konsep desain produk yang terdiri dari konsep audio, ukuran gambar ataupun audio, resolusi serta format *file* audio ataupun gambar, navigasi, tampilan awal, tampilan isi, tampilan latihan hingga tampilan penutup.

Selecting data kata-kata asing *Auto Body Repair* merupakan tahapan pengumpulan data kata-kata asing pada buku-buku baik modul, *new step body*, dan modul yang digunakan dalam pembelajaran perbaikan bodi otomotif. Pemilihan kata-kata asing yang akan dijadikan isi konten dalam *resources Auto Body Repair Dictionary* berbasis *Android* berfokus pada kata-kata yang terdapat pada 5 Kompetensi Dasar pada Kompetensi Keahlian Teknik

Perbaikan Bodi Otomotif. Pembuatan *database* merupakan kelanjutan proses dari *selecting data* dengan memanfaatkan penggunaan MS. Excel untuk memudahkan pengurutan istilah-istilah asing *Auto Body Repair* sesuai dengan abjad dari A-Z dan input data ke dalam aplikasi nantinya. Pembuatan *database* dikatakan selesai apabila keseluruhan *draft* kata yang telah dikumpulkan masuk kedalam *draft* data secara urut.

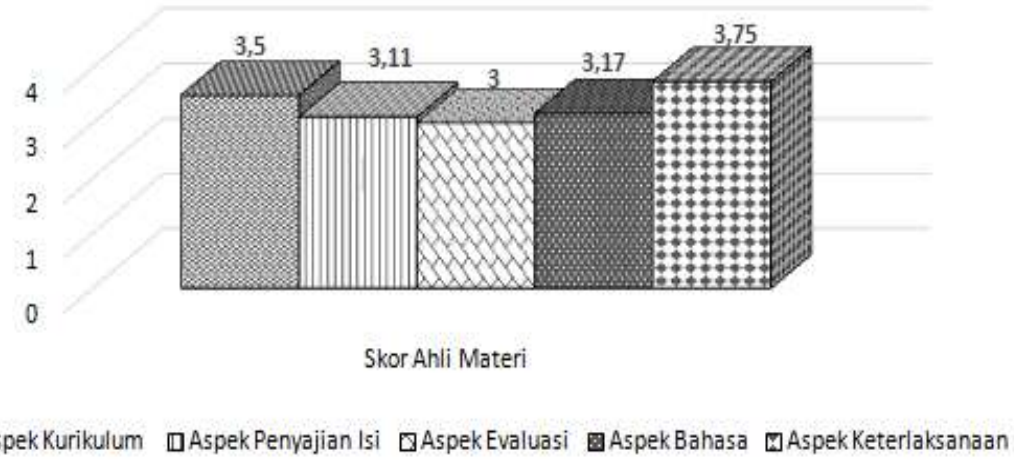
Input data merupakan pengintegrasian *database* dengan aplikasi Android Studio dengan menggunakan aplikasi *DB Browser (SQLite)*. Hasil dari pengintegrasian *database* tersebut adalah file berformat SQLite dan dengan format file tersebut maka file terkait istilah-istilah asing *Auto Body Repair* sudah siap untuk dilakukan proses *output* data melalui Android Studio. *Output* data menjadi tahapan akhir dalam menghasilkan produk yang dikembangkan. Pada tahapan ini *database* SQLite yang telah terintegrasi ke dalam Android Studio selanjutnya dilakukan proses *output* data sehingga menghasilkan *file Auto Body Repair Dictionary.apk* berformat APK. *File* APK berbasis aplikasi inilah yang nantinya dapat digunakan pada perangkat *smartphone* Android dengan cara diinstal seperti pada penginstalan aplikasi *smartphone* pada umumnya.

Produk yang telah dikembangkan dilakukan validasi oleh ahli materi. Hasil validasi oleh ahli materi dilakukan guna mengetahui kelayakan dan kualitas media yang dikembangkan dari aspek kurikulum, aspek penyajian isi, aspek tata bahasa dan aspek keterlaksanaan. Gambar 1 menyajikan hasil yang diperoleh berdasarkan hasil validasi oleh ahli materi.

Rerata hasil uji kelayakan oleh ahli materi diperoleh skor 3,38. Skor tersebut menunjukan bahwa kualitas media yang dikembangakan berdasarkan aspek materi termasuk dalam kategori layak untuk digunakan dalam memfasilitasi siswa untuk menguasai istilah-istilah asing pada mata pelajaran *Autobody Repair*.

Hasil penilaian media oleh ahli media dilaksanakan guna mengetahui kelayakan media dari sisi media. Adapun aspek yang dinilai oleh ahli media di antaranya adalah terkait aspek kualitas tampilan, rekayasa perangkat lunak, *interface*, *reusable*, *maintainable,* dan *compatibility*. Gambar

Gambar 1. Grafik Skor Validasi Ahli Materi



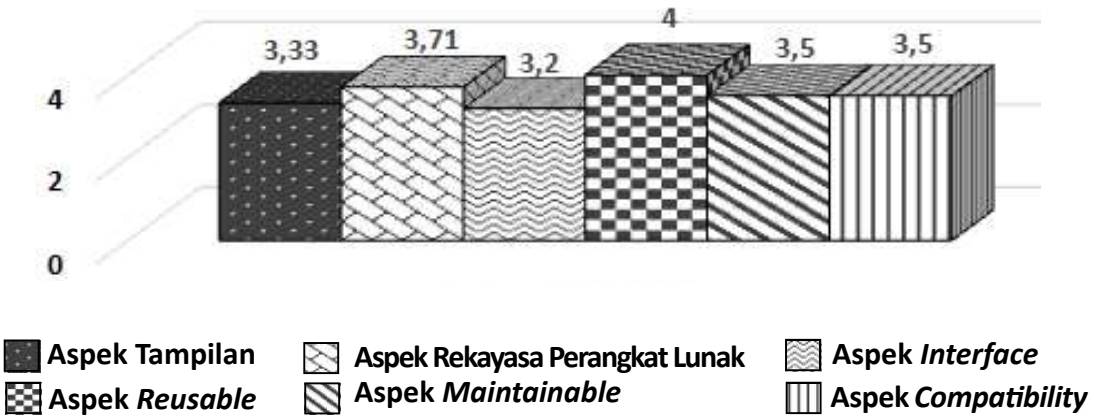
2 menyajikan skor yang diperoleh pada masing-masing aspek.

Rerata hasil uji kelayakan oleh Ahli Media diperoleh skor 3,44. Rerata skor tersebut menunjukan bahwa media yang dikembangkan berdasarkan penilaian oleh ahli media termasuk dalam kategori sangat layak.

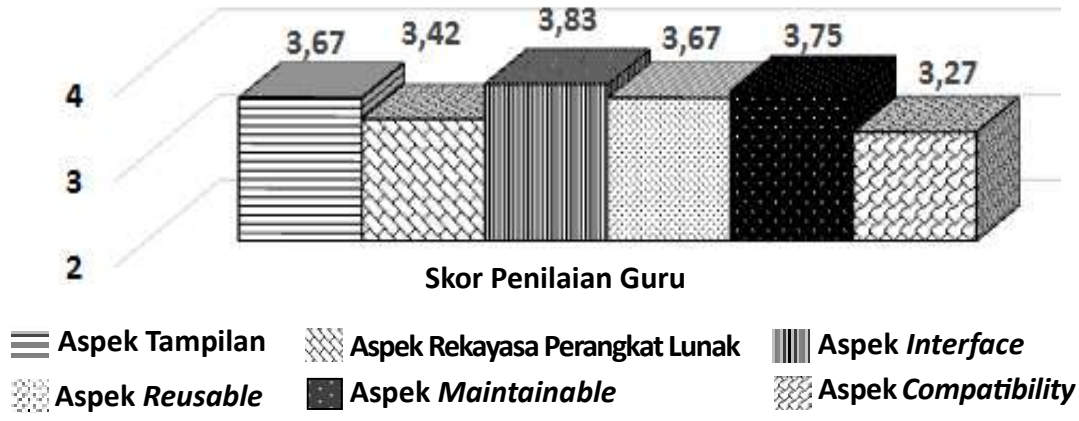
Penilaian media oleh guru melibatkan tiga guru teknik perbaikan bodi otomotif. Hasil dari penilaian guru terhadap kelayakan media menunjukan hasil yang positif. Penilaian ini meliputi adalah aspek kurikulum, penyajian isi *Kamus Perbaikan Bodi Otomotif*, tata bahasa, keterlaksanaan, dan rekayasa perangkat lunak. Skor hasil penilaian media oleh guru pada kompetensi keahlian teknik perbaikan bodi otomotif dapat dilihat pada Gambar 3.

Rerata keseluruhan hasil penilaian oleh guru memperoleh skor 3,58. Skor ini menunjukkan bahwa *resources* yang dikembangkan berdasarkan penilaian guru termasuk dalam kategori sangat layak

Gambar 2. Grafik Skor Validasi Ahli Media



Gambar 3. Grafik Skor Penilaian Guru



untuk digunakan oleh siswa sebagai upaya meningkatkan penguasaan istilah-istilah asing *Autobody Repair* pada bahan ajar teknik perbaikan bodi otomotif.

Hasil keseluruhan penilaian *resources* yang dikembangkan menurut para ahli materi, ahli media, dan guru memperoleh skor rerata 3,47 (kategori sangat layak). Hasil keseluruhan penilaian oleh ahli materi, ahli media dan guru disajikan pada Tabel 4.

Setelah dilaksanakan proses validasi terhadap *resources* oleh para ahli dan guru, selanjutnya adalah melakukan uji respons siswa. Uji respons siswa yang dilaksanakan melalui 3 tahapan uji yaitu uji coba lapangan awal, uji coba lapangan utama dan uji coba lapangan operasional. Pada uji coba respons siswa terdapat 3 aspek yang dinilai yaitu aspek kualitas tampilan, keterlaksanan, dan rekayasa perangkat lunak.

Hasil respons siswa pada uji coba lapangan awal diperoleh skor 3,33. Skor ini menunjukan bahwa respons siswa pada uji coba lapangan awal termasuk dalam kategori layak. Selanjutnya, dilaksanakan uji coba lapangan utama yang melibatkan 6 siswa teknik perbaikan otomotif yang dipilih secara acak dan dipersilahkan untuk menggunakan *resources* yang telah dikembangkan. Skor yang diperoleh pada uji coba lapangan utama ini adalah 3,46. Hasil ini menunjukan bahwa respons siswa pada uji coba lapangan utama termasuk dalam kategori sangat layak.

Setelah mengetahui respons siswa pada uji coba lapangan utama, selanjutnya dilaksanakan uji coba operasional yang melibatkan 20 siswa. Hasil uji coba lapangan operasional memperoleh skor 3,48 sehingga termasuk dalam kategori sangat layak. Rangkuman hasil respons siswa secara keseluruhan disajikan pada Gambar 4.

Rerata keseluruhan uji respons siswa yang meliputi uji coba lapangan awal, uji coba lapangan utama dan uji coba lapangan operasional diperoleh skor 3,43. Skor tersebut menunjukan bahwa *resources* yang dikembangkan berdasarkan uji respons siswa termasuk dalam kategori sangat layak.

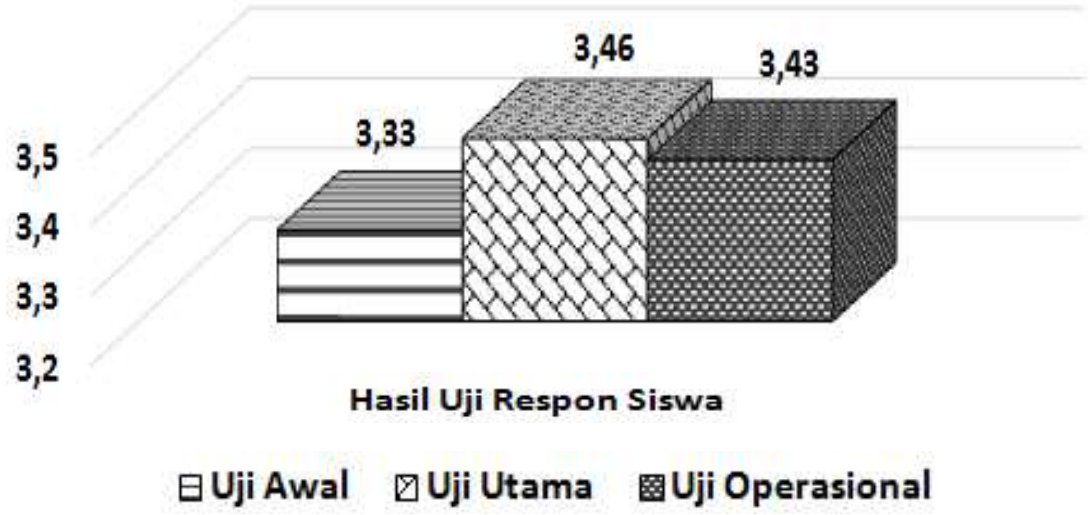
Kefektifan produk yang dikembangkan diukur berdasarkan peningkatan aspek kognitif yang dimiliki siswa sebelum diberikan perlakukan melalui *pretest* dan setelah diberikan perlakukan melalui pelaksanaan *posttest*. Rerata hasil belajar *pretest* yang dilaksanakan memperoleh skor 70,76 dengan klasifikasi hasil kognitif termasuk dalam kategori baik. Setelah diberikan perlakuan dengan memberikan *treatment* dan *resources* yang telah dikembangkan sebagai media penguasaan istilah-istilah asing *Autobody Repair*, kemudian dilaksanakan *posttest*. Hasil *posttest* siswa diperoleh skor rerata 83,03 dengan klasifikasi hasil kognitif termasuk dalam kategori baik sekali.

Analisis peningkatan hasil belajar kognitif *pretest* dan *posttest* dianalisis

Tabel 4
Rerata Penilaian Ahli & Guru

Penilaian Ahli & Guru	Skor	Kategori Penilaian
Ahli Materi	3,38	Layak
Ahli Media	3,44	Sangat Layak
Guru	3,58	Sangat Layak
Rerata Skor Keseluruhan	*3,47*	Sangat Layak

Gambar 4. Grafik Hasil Uji Respon Siswa



dengan menggunakan rumus *N-Gain* (Tabel 5). Berdasarkan hasil analisis terhadap peningkatan hasil belajar aspek kognitif melalui *pretest* dan *posttest* maka dapat disimpulkan bahwa *resources Kamus Perbaikan Bodi Otomotif* berbasis *Android* merupakan media yang efektif dalam meningkatkan penguasaan istilah asing *Autobody Repair* pada bahan ajar Perbaikan Bodi Otomotif. Peningkatan hasil belajar aspek kognitif tersebut didukung dengan hasil analisis *N-Gain* yang memperoleh skor 0,42 yang termasuk dalam kategori sedang.

Penelitian pengembangan yang dilakukan menunjukkan peran teknologi pembelajaran untuk memfasilitasi siswa menguasai istilah-istilah pada bahan ajar perbaikan bodi otomotif. Hal ini merupakan sebuah upaya yang dilakukan untuk menuntaskan masalah belajar dengan mengacu pada definisi Teknologi Pendidikan menurut AECT 2008 yaitu melalui proses penciptaan, pemanfaatan dan pengelolaan proses dan *resources* yang sesuai dengan analisis kebutuhan yang dilaksanakan.

Hal tersebut juga diperkuat oleh pendapat Reigult dan Merril (Degeng, 2013, p. 12) yang menyatakan bahwa dalam proses perancangan pembelajaran yang tepat sehingga siswa dapat mencapai tujuan pembelajaran maka perlu dilakukan analisis terhadap variable kondisi yang meliputi karaktertik siswa, karakteristik bidang studi dan kendala yang dihadapi. Analisis tersebut telah dilaksanakan dalam proses pengembangan produk *resources*

Tabel 5
Uji N-Gain Hasil Belajar 29 Siswa

Pretest	*Posttest*	*Gain Score*	Kategori *N-Gain*
70,76	83,03	0,42	Sedang

Kamus Perbaikan Bodi Otomotif berbasis *Android*.

Hasil uji efektivitas media dalam meningkatkan penguasaan istilah pada bahan ajar teknik perbaikan bodi otomotif memiliki relevansi dengan pendapat yang disampaikan oleh Indriastuti (2017, p. 54) yang berpendapat bahwa pemanfaatan media *(resources)* memiliki tujuan agar siswa dapat memahami materi lebih mudah, lebih antusias dan kualitas belajar dapat lebih ditingkatkan. Hal ini juga diperkuat oleh penelitian yang dilakukan oleh Heflin, Shewmaker, dan Nguyen (2017) terkait *Impact of Mobile Technology on Student Attitudes, Engagement, and Learning* yang menunjukan bahwa pembelajaran yang memanfaatkan perangkat *mobile* sebagai *resources* memberikan dampak yang positif terhadap peningkatan pemahaman siswa dalam melaksanakan sebuah proses pembelajaran.

SIMPULAN

Hasil Pengembangan Kamus Perbaikan Bodi Otomotif berbasis *Android* merupakan media yang layak untuk meningkatkan penguasaan istilah-istilah asing *Autobody Repair* pada bahan ajar teknik perbaikan bodi otomotif. Hal tersebut dikarenakan *resources* yang dikembangkan telah divalidasi oleh ahli materi, ahli media dan dilakukan penilaian oleh guru. Hasil penilaian para ahli dan guru memperoleh rerata skor penilaian 3,47. Rerata skor tersebut berdasarkan kriteria penilaian termasuk dalam kategori sangat layak. Keefektifan ini dapat dilihat dari peningkatan hasil belajar aspek kognitif sebelum diberikan perlakukan *(pretest)* dan setelah diberikan perlakukan *(posttest)*. Hasil belajar yang diperoleh berdasarkan *pretest* yang dilaksanakan memperoleh nilai 70,76 setelah diberikan pelakuan dan dilaksanakan *posttest* diperoleh nilai 83,03. Peningkatan hasil belajar sebelum dan setelah diberikan perlakuan termasuk dalam kategori sedang dengan skor *N-Gain* 0,42. Berdasarkan hasil dan pembahasan yang telah disampaikan sebelumnya, adapun saran untuk penelitian selanjutnya adalah pengembangan ini dapat dikembangkan pada *platform handphone* lain selain *android* dan dilakukan penelitian dalam skala yang lebih luas.

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3-DIMENSIONS OF INTERACTIVE MULTIMEDIA VALIDITY TO INCREASE VISUAL-SPATIAL INTELLIGENCE IN MOLECULAR GEOMETRY

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Abstract

The research aimed to find out the properness of the 3-dimensions (3D) interactive multimedia as the learning media to increase student's visuospatial intelligence in molecular geometry. This research and development used design of 4D by Thiagarajan that was modified by Ibrahim. Modified design implemented until third step (development phase). The research subject was 10th-grade students that were getting molecule shapes geometry sub-matter. The 3D interactive multimedia was declared as valid based on the expert judgement through validation process by three validators consisting of 2 lecturers and 1 chemistry teacher. The content and construct validity sheet are used as an instrument on the validation process. Multimedia validity can be avowed from content validity and construct validity. The content validity was determined by the content standard and content systematic criteria including usefulness in promoting students' visuospatial intelligence. The construct validity was determined by software techniques and visual communication. Validation result data was used quantitative descriptive analysis. According to the validation result, the content and construct validity percentage results as 81% and 84% at the more valid category, so that 3D interactive multimedia can be declared valid as a learning media. The media will be useful to improve the learning quality.

Keyword: *3D interactive media, visual-spatial intelligence. molecular geometry*

NTRODUCTION

Chemistry is the natural science that explains the matter and its changes in nature. Chemistry is commonly known as central natural science because the role is closed to our daily life (Manahan, 2017, p. 56). It also can connect between one study to other natural sciences through it. This role makes this subject has three representation levels of skill that consist of macroscopic, sub-microscopic, and symbolic levels (Becker, Stanford, Towns, & Cole, 2015). The macroscopic level is representation level form as fact phenomenon and can be observed, such as chemistry changes phenomenon in daily life. The sub-microscopic level is a representation level based on the real observation but still needs some theories to explain what occurred in the molecular part using theoretic representation, such as microscopic particles that cannot be seen directly. The symbolic level is a representation based on the fact and converted into some simple mark, such as symbol representation from the atom, molecule, and compounds in figure, algorithm, and computer processing forms. It makes this study is also classified as a difficult subject by the students. It causes various skills that are needed by students to understand it. Furthermore, the subject matter that has different levels

makes the students mostly not interesting in the chemistry learning process. This study is composed of fundamental matters such as the atomic structure, periodic table system, chemical bonding, stoichiometry, and others that have abstract concepts.

The main chemistry studies mastery especially chemistry bonding studies properly needed to understand the whole chemistry studies. Chemistry bonding is one of the main chemistry studies that have a role in the chemistry changes process (Ghibaudi, Cerruti, & Villani, 2019). This matter can be understanding if the students have a good representational skill. Chemical bonding characteristics are tendency onto sub-microscopic and symbolic levels. The skill at this level can represent the factual phenomenon that cannot be observed by human sense. As an alternative, the symbols, signs, and marks are used to represent the molecule and the compound in the real condition. The molecular geometry is the sub-matter in the chemical bonding matter. This sub-matter explains the variety of molecular shapes can affect their characteristics such as their interactions and properties. It makes the representational skills also needed by students to be mastery of this sub-matter. Visualization of molecular shapes in the learning process is properly needed to understand the kind of shapes and angles to make students' comprehension.

Representational skills and visualization process are the two main parts that can be connected by visuospatial intelligence. This visuospatial intelligence refers to a person's capacity to identify visual and spatial relationships among objects. Visuospatial ability is measured in terms of the ability to imagine objects, to make global shapes by locating small components or to understand the differences and similarities between objects (Trés & Brucki, 2014). Visuospatial intelligence is also one of intelligence that enables one to visualize information and synthesize data and concepts into visual metrics or images (Suprapto, bin Ahmad, Chaidir, Ardiansyah, & Diella, 2018). The urgencies of visuospatial intelligence in the chemistry learning process related to the student's representational skills development. It confirmed by (Sunyono & Sudjarwo, 2018) that says the chemistry learning that combines the transforming process of the sub-microscopic representation (visual) into verbal and symbolic or vice versa can help the student better to gain the concept quickly. Also, the students can represent the molecular shapes definitely if they have high visuospatial intelligence (Wu & Shah, 2014). There is various method to increase visuospatial intelligence in chemistry learning. The major method is showing chemical dynamics and properties interactively and visualization chemical properties between 2 dimensions and 3 dimensions. It also is supported by Carlisle, Tyson, and Nieswandt (2015) that state three method that increase visuospatial intelligence consist of showing symmetrical planes, visualizing the transformation between 2 and 3 dimension, and translating molecular shapes from formula into symbolic shapes.

Visuospatial intelligence is including into the students' difficulties when learning chemistry. It proved by the national examination on senior high school 2018 at chemistry subject outcomes, the result percentage of completeness as 50.56% under minimal categorized as 55%. In case, the result percentage of chemical bond in national examination 2018 as 51.50% that means low completeness in the chemical bond concept. It indicates that the students still have difficulties caused by the stagnant development of visuospatial intelligence. It confirmed by Sunyono and Sujarwo (2018)

that says the majority of high school students still have an understanding of chemistry at the macro level, the ability of reasoning is only able to produce a very simple mental model that is still in the low category. It also corresponds with the findings of the students' questionnaire that shows 66% of the students are uninteresting with chemistry learning and 44% completeness of pre-test results. It related with (McCollum, Regier, Leong, Simpson, & Sterner, 2014) findings that states cannot reason, represent and interpret the phenomenon of sub-microscopic concepts of atomic structure can blunt the power of students' mental models in understanding chemical phenomena become less well established. In teacher perspective, based on the result of the chemistry teacher interviewing process, it found that classroom learning has been limited to lecture methods, the use of physically learning media such as molecular shapes models (*molymod*) is limited, and digitally also limited with the use of a PowerPoint slides that contain a description of the material. It indicates less representation in sub-microscopic and symbolic with a less appealing look for students. Furthermore, based on Merchant *et al*. (2013) findings that show the imagination of the students has not focused properly, the ability to draw and describe the phenomena of atomic structure deviates from the supposed image.

These outcomes are not corresponding with the rules of Indonesia Education and Culture Minister on number 68 in 2014 that states to create a learning atmosphere and process actively, the teachers are expected to use various learning resources to maximize the student's potential development. Learning resources need to be supported by the use of information and communication technology that can explore effective and efficient learning resources.

The teacher and the student in this era should adapt and explore various learning resources. The creativity of the teachers when choosing and using learning resources learning has important rules in molecular geometry learning. Learning resources can be applied to visuospatial intelligence development. Representational learning could stimulate the students to be actively engaged to solve chemical problems especially to interpret and to transform macro, sub-micro, and symbolic phenomena. Moreover, based on Sunyono and Meristin (2018) findings, the students were allowed to observe a demonstration of animation activities, analyzing sub-micro visual images, and building concepts through reasoning to improve mastery of their concepts. These activities can occur when using suitable learning media.

Based on the explanation before, it required a learning media that can increase visuospatial intelligence through showing and visualizing the transformation of molecular geometry, so that this learning media can help the students to get a better understanding.

Based on the reason that explained, it needed the development of interactive multimedia based on 3-dimensional visualization to increase students' visuospatial intelligence, and their interest in molecule shapes geometry learning. A 3D interactive multimedia is software with format *.html* that can be played in all kinds of computer browsers. It is portable to use in any computer device and shows molecule shapes geometry concept with the interactive feature, such as 3-dimensional molecule shapes that can take 360^{o} rotation, molecule shapes in 2 dimensions, and the exercise that can increase students' visuospatial intelligence. According to the background problem, it makes the research of interactive 3D multimedia validity to

increase students' visuospatial intelligence in molecule shapes geometry properly needed to take it.

METHOD

This study used Research and Development (R&D) design that refers to the development design of 4D Thiagarajan, which modified by Ibrahim (2001) in the development phase. The phase of this method consisted of 3 phases from define, design, and development.

The first phase was "define" that has the function to consider and determine the requirement of learning needs. To know it, the analysis process was needed to explain the need and requirements. In this phase, the analysis process is divided into 5 kinds of analysis that consist of curriculum analysis, student analysis, task analysis, concept analysis, and learning objectives. In curriculum analysis, curriculum 2013 that revised in 2016 is used as the learning base in the majority school in Indonesia. Cognitive core competence 3 and 4 in curriculum 2013 was focused on chemistry learning. It had the main scope to prepare the student to be creative and innovative on the industrial revolution 4.0 competition. In student analysis, the senior high school students have average age at 17 years old, based on Piaget's theory in the cognitive learning theory, the students at this age are categorized on the formal operation phase that can think abstract and dynamics. In this age, the students can control the navigation of multimedia that similar to using their gadget app. In concept analysis, molecular shape geometry sub-matter can be breakdown into two concepts the first is molecular shapes based on valence shell electron pair repulsion (VSEPR) theory and Hybridization theory. The two concepts have characteristics like representation and visualization molecular shape, it makes the visuospatial intelligence needed to make good representation. The good students' representation can be increased in chemistry learning with several methods like increase ability to understand molecular symmetry, visualize molecular shape from chemical formula to 3 dimensions, and translation molecular shape from 2 dimensions to 3 dimensions (Carlisle *et al*., 2015). Task analysis and objective learning is taking based on the curriculum analysis. Basic competence 3.6 is used as the foundation of learning objectives in this research.

The second phases was "design" that has the function to plan the media and the format used in this research. There were 4 steps to make a good plan format and media. There are criteria test creation, media selection, format selection, and first design media creation. The criteria test creation was the composition process to make learning media based on the learning objectives in the phase before. The media selection was the process to select a kind of media that suitable for the characteristic of sub-matter. Multimedia can combine text, graphics, audio, visual, and audio-visual. It made the students could easily represent molecular shapes. The format selection was used to know the best storyboard of multimedia that already chosen. The format multimedia can be divided into 5 formats such as a tutorial, drill and practice, simulation, experiment, and gamification (Daryanto, 2013, p. 166). The format that choosing is the tutorial, it suitable for the sub-matter characteristic that predicts molecular geometry. The first design media was created with many steps and tools, Inkscape 0.92.4 is the free graphic tools that use to create illustration and some assets in this multimedia, PowerPoint is used to create the simple 2-dimensional animation, Blender 3D is used to create the molecular shape model in 3-dimensional

form, and Articulate Storyline 3 is used as the display engine that combines all assets like graphics, text, audio, video, and 3-dimensional molecular shape into one package software with the extension format *.html*. This format can be opened in all kinds of computer browsers that support html5 and java.

The last phase was "develop" that has the function to ensure the criteria of multimedia that suitablematter characteristics and can be implemented. Develop phase was consist of two steps, the first was the expert appraisal and development testing. The expert appraisal was the step that measures multimedia validity. In this step, the expert assessed the interactive multimedia through the study and validation process. The study process was the process of the expert provided suggestions about the first interactive multimedia design. After revision refers to expert suggestion, the validation process can behold. In this step, the validation sheet was used as the assessment instrument. The validity of multimedia can be proven by two criteria, content validity and construct validity. Content validity wass a validity criterion based on the matter of relevance with learning objectives and the curriculum. There were two aspects of this criterion, based on content states and its systematics (Baloyi, Ojo, & Van Wyk, 2017, p. 67). The construct validity is the validity criterion based on the matter consistency that can be referred from software techniques and visual communication.

The validation process was carried out by 3 validators that consist of two chemistry lecturers and one chemistry teacher. The validation assessment used quantitative descriptive analysis. The criteria in the validation sheet used the Likert scale that was presented in Table 1.

Table 1
Likert Scale

Criteria	Score
Very Unsatisfied	1
Unsatisfied	2
Neutral	3
Satisfied	4
Very Satisfied	5

The validation result was converted from 3 validators to obtain the validation categories. The formula can be written like:

$$P(\%) = \frac{\sum Score\ that\ obtained}{Maximum\ Score} \times 100\%$$

Attachment:
Score = (high score each item) x (the amount of items) x (3 validators)

The percentage result will be interpreted based on Table 2 that shown.

Table 2
Score Interpretation Table (Arikunto, 1992)

Percentage (%)	Categories
0 – 20	Very Insufficient
21 – 40	Insufficient
41 – 60	Sufficient
61 – 80	Valid
81 – 100	Very Valid

3D Interactive Multimedia can be stated as valid as the learning media if the content and construct validity result percentage had more than 61% validity with the minimum score per aspect was 3 (Ismail, 2018, pp. 67-74).

FINDINGS AND DISCUSSION

The 3D interactive multimedia is the software that developed with *.html5* based and can be operated on the various desktop browsers. It is a portable format and can present interactive molecular geometry

concept through 3-dimensional molecular geometries that can be interacted in 360°, 2-dimensional molecular forms, and interactive quizzes that help the students to increase their visuospatial abilities. This multimedia is consisting of 7 menus. The landing page is the initial menu seen when this multimedia is activated. There are the instructions for use, the Author description, the language options, and the button to the home page that contains the 6 main menus. Home is the main page that contains the 6 main menus and provides a short description of the menus. This Multimedia is featured with two language options (bilingual), which is the Indonesian language that becomes the main language (default) and the English option that can be set on the Start page.

The introduction is a concept recognition menu, which begins with the type of basic competency and the introduction of molecular form geometry material. The phenomenon is a menu that displays natural events that occur due to the influence of molecular form geometry which is accompanied by short questions to practice understanding.

VSEPR theory is a menu that contains material related to VSEPR theory which is one of the methods used in the forecasting molecular forms. At the end of this menu, you will be presented with a visualization of molecular forms models based on the VSEPR theory in 2 dimensions and 3 dimensions.

Hybridization theory is a menu that contains material related to hybridization theory which is one of the methods used in the process of forecasting molecular forms. At the end of this menu, you will be presented with the visualization of

Figure 1. Landing Page

Figure 2. Home Screen

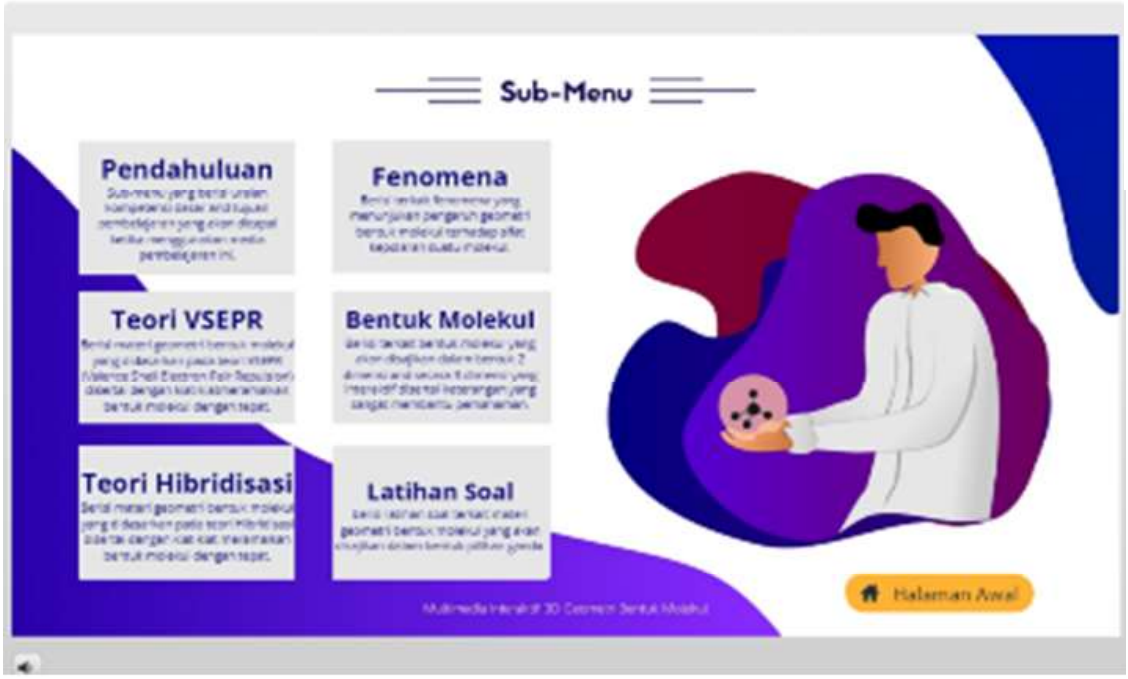


Figure 3. VSEPR Theory Menu

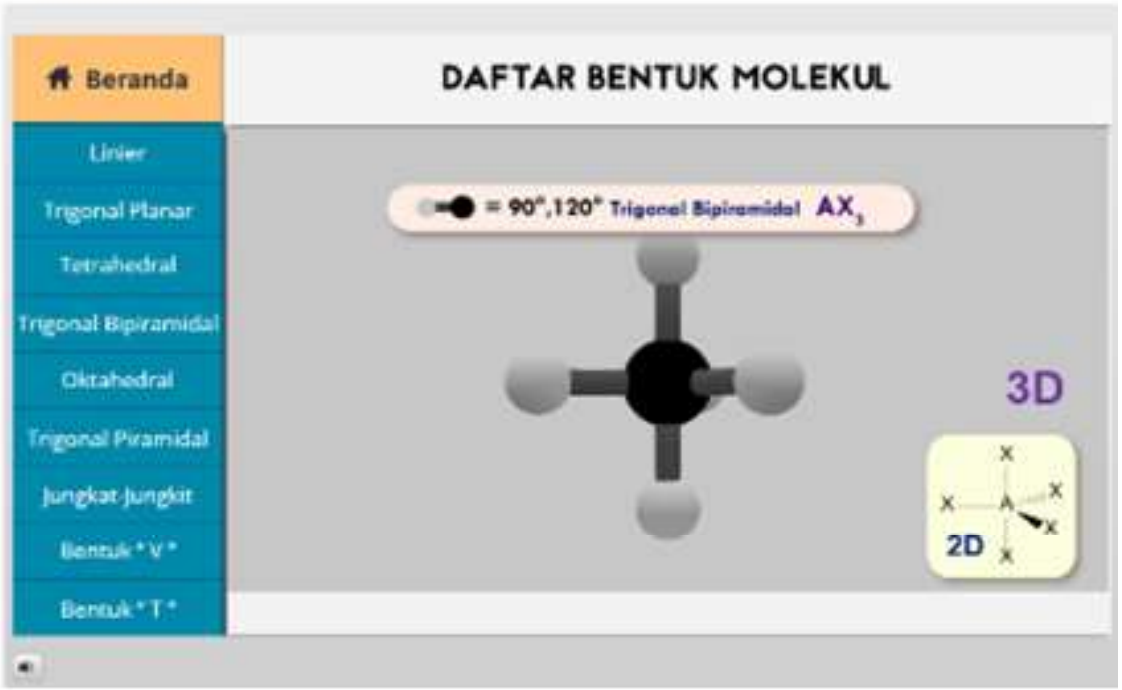
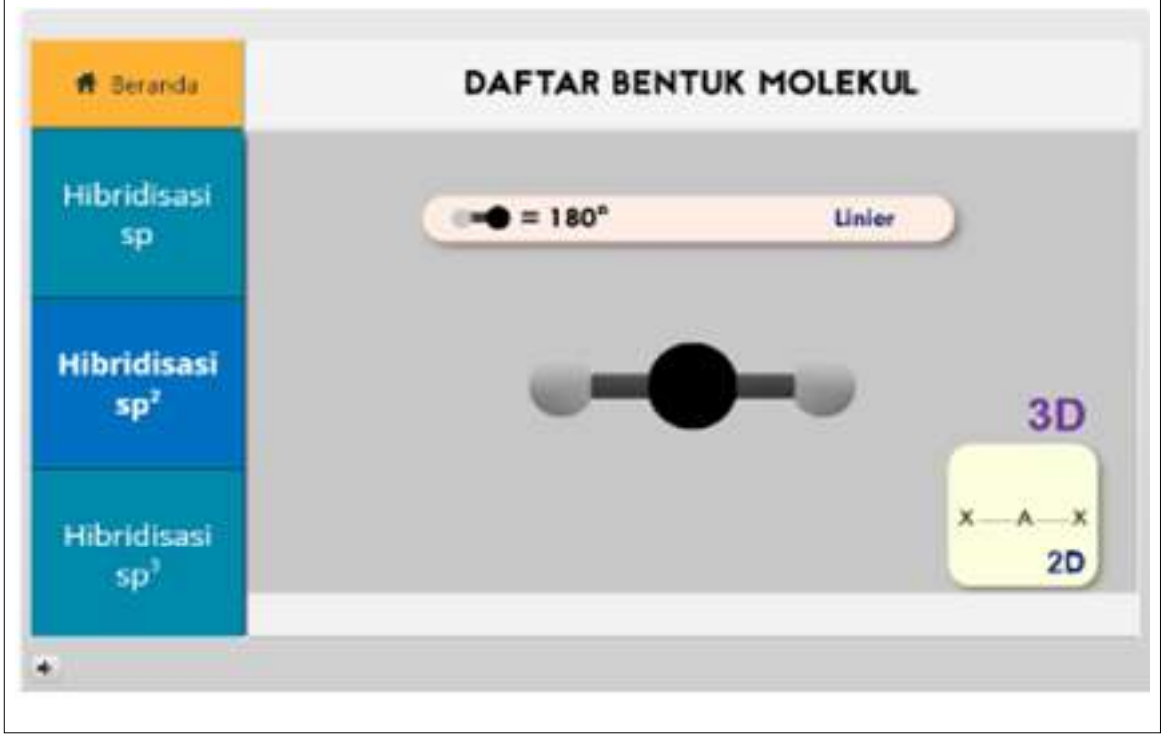


Figure 4. Hybridization Theory Menu



molecular forms models based on the theory of VSEPR in 2 dimensions and 3 dimensions.

The Nature of Molecular Shapes is a menu that presents the visualization of real molecular forms that exist in nature in 3 dimensions. So, learners can analyze differences in molecular-form models according to the VSEPR theory and hybridization with real molecular forms.

Exercise is a menu that contains exercises about sub-material geometric forms of molecules aimed at improving visual-spatial intelligence and understanding concepts.

Multimedia implementation is assessing to the experts in knowing the validation quality of interactive 3D multimedia. The assessment process is divided into two parts, the first is the study process, and the second is the validation process. The study process is occurring to obtain the suggestions to make the interactive 3D multimedia to be better. The study process result can be used as the suggestion to repair the interactive 3D multimedia. The suggestion of the study process is like the font kind and size selection, the illustration design, the arrangement of text and graphics, the guidance revision, and the remodel of molecular shapes 3D. After the revision, interactive 3D multimedia will be assessed on the validation process. The validation process is done by 3 validators that consist of two lecturers and one chemistry teacher. The assessment process is using a Likert scale from 1-5 that advance proceeds. The score will be represented into percentage interpretation validity.

The content systematics criteria on the criteria of content validity is a

Figure 5. Nature of Molecular Shapes

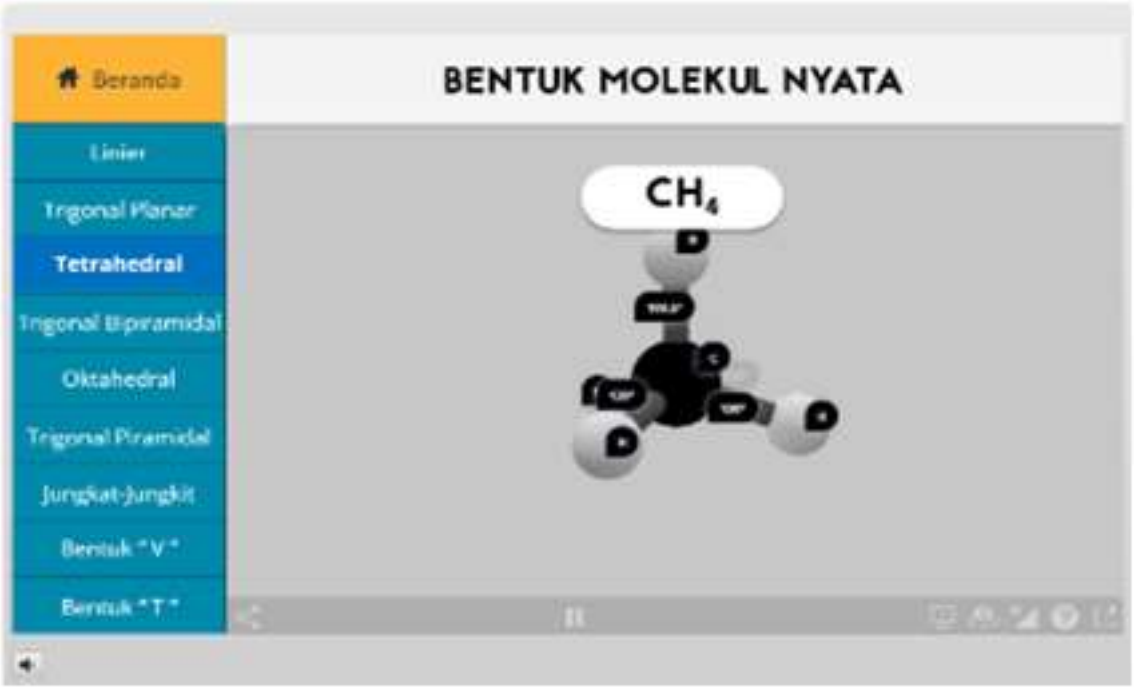


Figure 6. Exercise Menu

criterion related to the linkage between the concepts of material and systematics in the evaluation. These criteria can be reviewed based on ease of understanding, clarity of logic flows, clarity of discussion descriptions, and accuracy of evaluation. Simply put, the content systematics in 3D Interactive multimedia is contained in storyboards and flowcharts that have been designed.

The average content standard criteria percentage in content validity has 82% validity with the 73% validity of scope and depth of learning objectives ((Table 3). This result means interactive multimedia has less scope and learning objectives are caused by the objective focus on the molecular shapes prediction method. It makes the multimedia only focus on the students' ability to predict molecular shapes and does not explain the detailed information about molecular shapes geometry matter. The learning motivation aspect in this criterion has 93% of validity caused by the presence

Table 3
Content Validity Summaries

Number	The Aspects	Validator			Percentage	Criterion
		1	2	3		
Content Standard						
1	Clarity of learning objectives	4	4	4	80%	Valid
2	The relevance of learning objectives with curriculum	4	4	4	80%	Valid
3	Scope and depth of learning objectives	3	4	4	73%	Valid
4	Learning motivation	5	5	4	93%	Very Valid
5	Completeness and quality of learning aid materials	4	4	4	80%	Valid
6	Material suitability with learning objectives	5	4	4	87%	Very Valid
7	Depth of material	4	4	4	80%	Valid
Total		29	29	28	82%	Very Valid
Content Systematics						
1	Easy to understand	4	4	4	80%	Valid
2	Flow logic clarities	4	4	4	80%	Valid
3	Clarity of explanation, discussion, example, simulation, exercise	4	4	4	80%	Valid
4	Evaluation consistency with learning objectives	5	4	4	87%	Very Valid
5	Accuracy and determination of evaluation tools	4	4	4	80%	Valid
6	Giving feedback on evaluation results	4	4	4	80%	Valid
Total		25	24	24	81%	Very Valid

of supporting media like solution flow changes phenomenon that makes students' interest increasing and motivating them to learn. The use of a phenomenon in media resources is important to make a simple view from the student perspective before learning with the media (Clark & Mayer, 2016, pp. 46-58).

The evaluation consistency aspect in content systematics criterium has 87% of validity that caused by the presence of exercise part in every multimedia menus. Evaluation consistency means the multimedia has the same standard exercise model in every menu. Consistency is one of the multimedia principles needed to involve students' cognitive skills (Giessen, 2014).

Based on the validation result data of interactive multimedia 3D geometry of molecular form, 3D Interactive multimedia geometry of molecular form can be expressed very valid based on the standard criteria of the contents with an average percentage of the validity of the content of 82% With a very valid category. On the content systematics criteria, the 3D Interactive multimedia geometry of the molecular form can be expressed very validly with an average percentage of the validity of the content of 81% with a very valid category. This result following the minimum percentage of a learning medium is considered valid if it has a validity percentage of ≥ 61% with a valid category (Ismail, 2018, pp. 67-74).

Construct validity is a criterion of validity that relates to the consistency of material and concept with its delivery method. The validity of the construction in this study can be reviewed through two criteria: technical software and visual communication.

The technical aspects of the software on the construct validity criteria relate to the ease of installing 3D interactive multimedia across various computer devices. This aspect can be reviewed based on multimedia reliability, ease of maintenance, and simplicity in its installation process. Multimedia is said to be reliable when it can be executed properly, not easily hangs, crashes, or stops during installation. Multimedia is said to be easy in maintenance (maintainable) When multimedia is composed and designed with the flow of the presentation, organizing, and linkage between the menus is good so easy in understanding.

Aspects of visual communication on the criteria of the validity of the construction are criteria related to the ease of operation of interactive 3D multimedia geometry of molecules. This aspect can be reviewed based on the clarity of video, language, and image in multimedia, the completeness of the usage instructions documentation, the quality of 3-dimensional models, and the completeness of the navigation. Table 4 shows the construct validity summaries.

The average percentage of software techniques is 78% in a valid category. The lowest percentage result is coming from the accuracies, interest, and usability with 73% of validity. This aspect means multimedia performance quality in the device. This multimedia can be operated by users in all kinds of browser computers that last updated in 2013 and so on. It makes several old browsers cannot operate it. The performance of multimedia is measured by media qualities and reliabilities (Zhao & Chen, 2018).

The visual communication criteria have an average percentage result in 84% of validity with media clarities that have the highest percentage result than the others. Media clarities aspects relate with qualities of supported media like the animation, graphics, and layout that increase

Table 4
Construct Validity Summaries

Number	The Aspects	Validator			Percentage	Criterion
		1	2	3		
Software Techniques						
1	Accuracies	3	4	4	73%	Valid
2	Reliable	4	4	4	80%	Valid
3	Maintainable	4	4	4	80%	Valid
4	Usability	3	4	4	73%	Valid
5	Interest	3	4	4	73%	Valid
6	Compatibility	4	5	4	87%	Very Valid
7	Installation Process	25	29	28	78%	Valid
Total		25	29	28	78%	Valid
Visual Communication						
1	Media Clarities	5	4	5	93%	Very Valid
2	Sustainability Media Assets	4	4	4	80%	Valid
3	3D Models Quality	5	4	4	87%	Very Valid
4	Visual Design	4	4	4	80%	Valid
5	Interactivity	4	4	4	80%	Valid
6	Animation and Movie	5	4	4	87%	Very Valid
Total		27	24	25	84%	Very Valid

student's interest and understanding. These clarities properly needed to support media performance and to make user experiences more comfortable (Rajendra & Sudana, 2018). Moreover, the learning media that has great clarities can stimulate the students to increase their motivation and help better understanding (Priyambodo, Wiyarsi, & Permanasari., 2012). This result is reinforced by (Winarti, Rahmini, & Almubarak., 2019) that state that the clarities aspect has important rules to improve the students to think more critically.

Interactive multimedia based on 3D visualization of the sub-material geometry of a molecule form is a learning medium that has the criteria of each so that aspects in the criteria of content validity and construction can be grouped according to multimedia criteria, interactive criteria, and good visualization criteria. Here is a grouping of assessment aspects in each criterion.

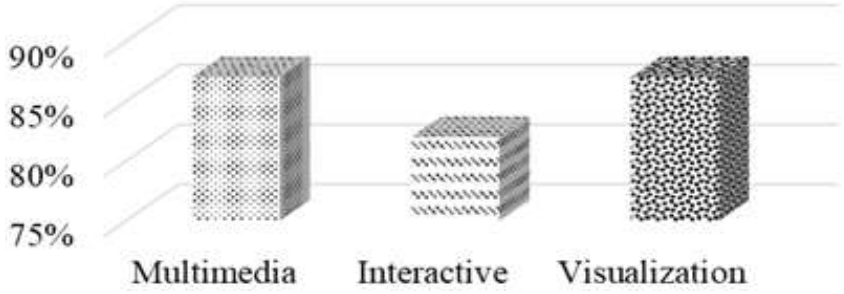
Table 5 presents the result of the interactive 3D mutlimedia validity. Based on the validation result data of interactive multimedia 3D geometry of molecular form, Interactive 3D multimedia geometry molecular shapes can be expressed very valid based on the content validity and construct validity result. This result following the minimum percentage of a learning medium is considered valid if it has a validity percentage of ≥ 61% with a valid category (Ismail, 2018, p. 67).

Based on the grouping of validation results according to multimedia, interactive, and 3D visualization criteria, a multimedia validity percentage of 82%-87% is achieved with a high valid category. This corresponds to the minimum criteria of learning media

Table 5
Interactive 3D Multimedia Validity Summaries

Number	The Aspects	Validator			Percentage	Criterion
		1	2	3		
Multimedia Characteristics						
1	Video Clarities	5	4	5	93%	Very Valid
2	Visual Design	4	4	4	80%	Valid
Total		9	8	9	87%	Very Valid
Interactive Characteristics						
1	Interactivity	4	4	4	80%	Valid
2	Evaluation consistency	5	4	4	87%	Very Valid
3	Evaluation tools accuracy	4	4	4	80%	Valid
4	Giving feedback on evaluation results	4	4	4	80%	Valid
Total		4	4	4	80%	Valid
Visualization Characteristics						
1	Three-dimensional model quality	5	4	4	87%	Very Valid
2	Moving Media (animation, movie)	5	4	4	87%	Very Valid
Total		10	8	8	87%	Very Valid

Figure 7. Percentage Chart of Each Criterion



validity ≥ 61% in a valid category. This result indicates that the development of this multimedia is needed to be applied as the learning media that help the students' visuospatial abilities. The combination between 2-dimensional and 3-dimensional molecular models and the use of visual models can contribute to increasing the students visuospatial. The use of the learning media that has this characteristic properly needed to be applied to the other same characteristic materials, so that, the students' understanding is not depending on the assumption or the imagination, but based on the high representational skills as the outcomes of proper learning media.

CONCLUSION

The 3D interactive multimedia that has been validated by several processes, Based on the validation result, the percentage result of content validity at 81,5 % with the

valid category and construct validity as 81% with the high valid category. It makes the interactive 3D multimedia can be states as valid as the learning media that can increase the students' visuospatial intelligence on molecular geometry sub-matter.

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PEMBELAJARAN TEKNOLOGI INFORMASI DAN KOMUNIKASI DITINJAU DARI MINAT BELAJAR

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Abstrak

Penelitian ini bertujuan untuk mengetahui minat belajar pada saat pembelajaran teknologi informasi dan komunikasi khususnya siswa kelas X SMK ditinjau dari minat internal, minat eksternal, dan pendekatan belajar. Subjek pada penelitian ini adalah semua siswa kelas X Program Keahlian Teknik Komputer dan Jaringan di SMK Negeri 3 Yogyakarta yang berjumlah 30 siswa. Data penelitian dianalisis dengan statistik deskriptif, sedangkan metode yang digunakan untuk mengumpulkan data dalam penelitian ini menggunakan angket modifikasi skala likert. Dari hasil penelitian menunjukkan bahawa pertama, pembelajaran teknologi informasi dan komunikasi sudah dilaksanakan tetapi terdapat kendala yaitu guru mengajar hanya sebatas teori. Kedua, sebagian besar siswa memiliki minat belajar dengan kategori sedang dalam pembelajaran teknologi informasi dan komunikasi. Dengan demikian, minat belajar pada pembelajaran teknologi informasi dan komunikasi perlu ditingkatkan lagi. Ketiga peningkatan minat belajar pada pembelajaran teknologi informasi dan komunikasi dapat dilakukan dengan memadukan model pembelajaran yang sesuai sehingga siswa dapat menguasai materi baik teori ataupun praktik.

Kata kunci: *pembelajaran, teknologi informasi dan komunikasi, minat belajar*

INFORMATION AND COMMUNICATION TECHNOLOGY LEARNING REVIEWED FROM INTEREST TO LEARN

Abstract

This study was aimed at determining the interest in learning information and communication technology of grade X vocational students in terms of internal interests, external interests, and learning approaches. The subjects in this study were 30 students of class X Computer and Network Engineering Skills Program at Vocational High School 3 of Yogyakarta. The research data were analyzed using descriptive statistics, while the method used to collect the data in this study was using a Likert scale modified questionnaire. The findings show that first, learning information and communication technology has been implemented but the teacher teaches only focus on the theory. Second, most students have an interest in learning with the moderate category in learning information and communication technology. Thus, interest in learning in learning information and communication technology needs to be increased. Third, increasing interest in learning in learning information and communication technology can be done by combining appropriate learning models so that students are able to master learning material both theory and practice.

Keywords: *learning, information technology and communication, learning interest*

PENDAHULUAN

Perubahan lingkungan baik dari segi sosial, budaya, ekonomi, hukum, ataupun teknologi secara tidak sadar berpengaruh dalam dunia pendidikan. Sekolah merupakan suatu lembaga yang bergerak dalam pendidikan formal memiliki peran penting dalam adaptasi siswa. Peran sekolah dalam adaptasi siswa memiliki harapan agar siswa dapat bersaing dengan kehidupan yang akan datang. Peran guru di sekolah memiliki kedudukan yang penting karena setiap hari siswa berinteraksi dengan gurunya. Namun, saat ini banyak guru yang kurang memahami perannya untuk membekali siswa di kehidupan selanjutnya. Suparman (2014, p. 14) menjelaskan bahwa guru berperan sebagai fasilitator dalam proses pembelajaran. Guru berperan memfasilitasi siswa yang tujuan akhirnya diperoleh proses dan hasil belajar siswa. Proses dan hasil belajar yang diperoleh kemudian diakumulasi dalam tiga aspek. Pada proses pebelajaran, siswa tidak hanya memperoleh aspek pengetahuan (*kognitif*), tetapi juga aspek sikap (*afektif*) dan aspek ketrampilan (*psikomotorik*) yang dihasilkan dari potensi siswa pada saat pembelajaran berlangsung.

Selain hasil belajar, guru hendaknya memberikan motivasi kepada siswa dalam belajar. Salah satu hal penting dan paling awal diperhatikan guru terhadap perkembangan siswa adalah minat. Rusyan (2015, p. 254) menjelaskan bahwa minat belajar adalah suatu keadaan pada mental seseorang yang menghasilkan proses yang memiliki tujuan yang jelas pada suatu situasi atau pada objek tertentu sehingga menimbulkan sesuatu yang menyenangkan dan dapat memberikan keputusan atas dirinya. *Pertama*, minat mencakup suatu hal tentang suatu kesukaan, kegemaran terhadap sesuatu, atau kesenangan terhadap suatu hal.

Minat belajar tidak ada dengan sendirinya. Minat belajar berasal dari berbagai faktor. Faktor-faktor tersebut yang nantinya berpengaruh pada diri seseorang. Slameto (2009, p. 43) mengatakan bahwa faktor-fator yang dapat mempengaruhi munculnya minat belajar pada diri seseorang terdiri dari; yang pertama Dorongan diri. *Kedua*, motif sosial. Minat yang berasal dari lingkungan sekitar seseorang. *Ketiga*, faktor emosional, minat mempunyai hubungan yang amat dekat dengan emosional. Seseorang memperoleh kesuksesan dari hasil kerja keras maka menimbulkan perasaan bahagia dan memperkuat minat tersebut. Namun, jika seseorang mendapatkan kegagalan, timbul perasaan tidak senang dan menghilangkan minat terhadap dirinya. Hal ini sama dengan kemampuan suatu lembaga pendidikan terhadap pemenuhan kebutuhan siswa atau mahasiswa. Apabila lembaga mampu meningkatkan kualitas, kemenarikan, dan fasilitas belajar, minat pun semakin meningkat. Hal ini diperkuat dengan hasil penelitian Surifah, Mustiati, Syaifullah, dan Bowo (2016) yang menemukan bahwa motivasi pada diri mahasiswa berpengaruh kepada minat belajar. Prodi Akuntansi terakreditasi B memiliki nilai yang lebih tinggi dan signifikan daripada Prodi Akuntansi yang terakreditasi C. Akreditasi A lebih tinggi dan signifikan daripada akreditasi C. Keberhasilan lembaga dalam meningkatan minat dipengarui dengan kelengkapan yang ditawarkan lembaga kepada siswa.

Minat sendiri memiliki beberapa indikator untuk menunjang proses belajar. Indikator tersebut berasal dari beberapa faktor yang ada pada diri seseorang. *Pertama,* faktor internal yaitu faktor yang ada pada diri siswa. Pada faktor internal terdiri dari dua bentuk yaitu fisiologis dan psikologis. Fisiologi berkaitan dengan fisik seseorang dan psikologis berkaitan dengan

kecerdasan dan bakat seseorang. *Kedua*, faktor eksternal yang terdiri dari lingkungan sosial dan lingkungan nonsosial yang berperan dalam menumbuhkan minat siswa. Lingkungan sosial terdiri dari keluarga, sekolah, ataupun masyarakat sedangkan lingkungan nonsosial terdiri dari materi yang diperoleh pada saat pembelajaran, alat-alat belajar, ataupun tempat tinggal. *Ketiga*, pendekatan belajar merupakan cara yang digunakan untuk memahami materi atau pokok bahasan tertentu dalam pembelajaran (Kawet, 2017).

Kemajuan Teknologi Informasi dan Komunikasi (TIK) yang pesat, diperlukan minat belajar yang baik pada diri seseorang. Perlu adanya penyesuaian yang mendorong seseorang untuk terus mempelajarinya. Dengan adanya pembelajaran teknologi informasi dan komunikasi diharapkan siswa dapat mengeksplor, mencari, dan menganalisis informasi yang berujung pada pertukaran informasi yang efektif dan efisien di masa yang akan datang.

Informasi yang didapat disertai tuntunan dari guru membuat siswa terus berpikir kreatif untuk mengembangkan pengetahuannya. Anshori (2017, p. 18) menyatakan bahwa manfaat yang diperoleh setelah mempelajari TIK antara lain: *pertama,* menyadarkan siswa terhadap potensinya dalam perkembangan TIK sehingga dapat memotivasi dan mengembangkan minatnya. *Kedua*, memotivasi siswa untuk siap beradaptasi terhadap perkembangan yang semakin berkembang pesat. *Ketiga*, mengembangkan kemampuan yang ada pada siswa dengan mengoprasikan dan mengembangkan teknologi informasi yang menarik. *Keempat*, manfaat mempelajari TIK adalah mengembangkan kemampuan belajar mandiri, berinisiatif, keratif, dan inovatif dalam penggunaan teknologi informasi pada saat menempuh pendidikan ataupun ketika telah bekerja.

Sekolah Menengah Kejuruan (SMK) merupakan salah satu sekolah yang mempelajari TIK. Pendidikan kejuruan saling berkaitan dengan keterampilan menggunakan alat atau mesin Nurmala (2012, p. 164). Pendidikan kejuruan merupakan perpaduan antara pengetahuan umum dan praktik, pemahaman konsep yang diterapkan dengan keterampilan, kemampuan kreatif yang menghasilkan produktivitas yang sasarannya untuk bekerja. Dengan adanya sasaran di SMK tersebut, perlu dilengkapi bekal pengetahuan tentang teknologi informasi dan komunikasi agar keahlian yang mereka miliki dapat tersalurkan di masa yang akan datang.

Di SMK terdapat mata pelajaran khusus yang mempelajari tentang TIK. Mata pelajaran yang dimaksud adalah Mata Pelajaran Simulasi dan Komunikasi Digital (SKD). Mata Pelajaran SKD diperuntukkan untuk seluruh keahlian di SMK yang menggunakan Kurikulum 2017 (Revisi Kurikulum 2013). Mata Pelajaran SKD mempelajari dan mengembangkan TIK melalui pengembangan produk digital. Sekolah yang menjadi fokus penelitian ini adalah SMK Negeri 3 Yogyakarta pada Program Keahlian Teknik Komputer dan Jaringan (TKJ) yang berjumlah 30 siswa pada Tahun Ajaran 2018/2019.

Pada saat dilakukan observasi pada tanggal 22 Februari 2019, setiap siswa dihadapkan dengan satu unit komputer yang lengkap. Di dalam kelas, tersedia layar proyektor untuk memudahkan guru mengajarkan mata pelajaran simulasi dan komunikasi digital. Lengkapnya fasilitas yang ditawarkan di sekolah akan sempurna apabila pembelajaran dilengkapi dengan model pembelajaran yang sesuai agar pembelajaran lebih inovatif. Muhson (2009) menjelaskan bahwa model pembelajaran mampu menjembatani kemampuan siswa

baik kemampuan pengetahuan (teori) maupun keterampilan (praktik). Dengan menggunakan model pembelajaran yang diterapkan di sekolah, harapannya dapat dijadikan salah satu alternatif pemecahan masalah yang sering muncul dalam pendidikan di Indonesia yaitu rendahnya kualitas dan relevansi pendidikan.

Berdasarkan hasil wawancara kepada siswa, pembelajaran SKD kurang menarik karena guru hanya membahas secara teori. Teori yang disampaikan guru ditampilkan dalam presentasi. Guru kurang mengarahkan pada kegiatan praktik sehingga siswa merasa sangat kurang memperoleh inti dari pembelajaran tersebut. Komputer yang disediakan mengalihkan perhatian siswa daripada mata pelajaran yang berlangsung. Pada saat peneliti mengajukan beberapa pertanyaan kepada siswa terkait materi pada mata pelajaran SKD, siswa tidak dapat menjawab. Siswa merasa masih kurang pemahaman tentang pertanyaan yang diajukan. Selain itu, guru juga bersikap kaku dan monoton sehingga membuat siswa enggan mengikuti pembelajaran. Di samping kelemahan tersebut, guru memiliki pengaruh yang baik terhadap perkembangan teknologi informasi dan komunikasi dengan menampilkan *slide* presentasi dengan bantuan proyektor.

METODE

Jenis penelitian yang digunakan dalam penelitian ini merupakan penelitian deskriptif dengan metode kuantitatif. Subjek penelitian adalah semua siswa kelas X Program Keahlian TKJ di SMK Negeri 3 Yogyakarta yang berjumlah 30 siswa pada Tahun Ajaran 2018/2019. Metode yang digunakan dalam penelitian ini adalah metode observasi, metode wawancara, dan metode angket tentang minat siswa mempelajari Mata Pelajaran SKD. Proses penilaian pada angket tentang minat belajar siswa dalam mempelajari TIK adalah dengan bentuk modifikasi *skala likert*. Modifikasi *skala likert* bertujuan untuk mengetahui kecendrungan jawaban yang diberikan siswa. Disediakan empat buah alternatif jawaban untuk setiap butir soal yang diajukkan. Empat jawaban tersebut adalah STS (Sangat Tidak Setuju), TS (Tidak Setuju), S (Setuju), SS (Sangat Setuju).

Kisi-kisi yang digunakan untuk angket minat belajar terdiri dari faktor internal, faktor eksternal, dan pendekatan belajar. Analisis data yang digunakan pada penelitian ini adalah hasil analisis deskriptif yang meliputi hasil rata-rata pada angket minat (M), Nilai maksimal yang diperoleh dari angket minat belajar (Maks), Nilai minimal yang diperoleh dari angket minat belajar (Min), dan standar deviasi (SD). Dari data deskriptif selanjutnya dilakukan pengkategorisasian minat belajar siswa dalam mempelajari teknologi informasi dan komunikasi. Sudjono (Komariyah, Afifah, & Resbiantoro, 2018) untuk mencari nilai dari kategorisasi angket minat disajikan pada Tabel 1.

Tabel 1
Kategori Pengelompokan Minat

Rentang Skor	Kategori
$X > (M+SD)$	Tinggi
$(M - SD) \leq X < (M + SD)$	Sedang
$X < M - SD$	Rendah

Keterangan: X = Nilai Perhitungan, M= Nilai rata-rata (*mean*), dan SD= Standar Deviasi

HASIL PENELITIAN DAN PEMBAHASAN

Kemajuan TIK dalam segala hal membuat manusia semakin dimudahkan. Berbagai lembaga baik pemerintahan ataupun swasta, pendidikan, pelayanan kesehatan, transportasi telah memanfaatkan

teknologi informasi dan komunikasi. Perubahan TIK yang sangat pesat membutuhkan proses adaptasi yang ketat. Manusia yang kreatif serta inovatif merupakan bekal yang diperlukan di zaman serba berkembang. Hal ini sejalan dengan penelitian Farah, Tarmizee, Abd Rahman, dan Zuraida (2018) yang menemukan bahwa dalam rangka menyongsong Abad 21 diperlukan kemampuan di antaranya kemampuan inovasi dan berpikir kreatif.

Salah satu bidang yang memperoleh dampak dari perkembangan TIK adalah dalam bidang pendidikan (Li, Yamaguchi, & Takada, 2018; Pima, 2019). Siswa mampu beradaptasi dengan lingkungan di zaman teknologi informasi diperlukan peran guru. Peran guru sebagai fasilitator di dalam kelas menjadi hal yang paling peting karena setiap hari guru berinteraksi dengan siswa. Guru yang baik terus mengupayakan agar pembelajaran dikelas dapat berjalan dengan baik dan dapat menghasilkan hasil belajar yang baik. Hal ini sejalan dengan penelitian yang dilakukan Li *et al*. (2018) yang menemukan bahwa guru merupakan faktor utama yang dapat mempengaruhi siswa dalam penggunaan TIK pada saat pembelajaran.

Hasil belajar tidak hanya menyangkut ranah pengetahuan saja tetapi ranah sikap dan keterampilan. Ranah sikap mencakup tindakan menerima, menanggapi, menilai, organisasi, dan karakterisasi (Sönmez, 2017; Zeinabsadat, 2015). Ranah pengetahuan mencakup kemapuan mengetahui, pemahaman, aplikasi, analisis, dan sintesis. Ranah keterampilan mencakup ketertarikan, mengkontrol, menanggapi situasi, dan menciptakan. Untuk mencapai hasil belajar yang baik, terdapat berbagai faktor yang menjadi dorongan siswa meningkatkan kemampuan. Penelitian Li *et al*. (2018) menemukan bahwa salah satu bentuk dorongan dari diri siswa yang semestinya menjadi perhatian guru atau tenaga pengajar adalah minat belajar siswa. Siswa yang memiliki minat belajar tinggi akan terus berupaya mengembangkan kemampuannya, sedangkan siswa yang memiliki minat rendah cenderung tertinggal dalam pengembangan kemampuan. Pembelajaran yang menjadi fokus penelitian adalah pembelajaran tentang TIK di SMK. Kemampuan teknologi informasi dan komunikasi yang terus diasah pada tingkat SMK memiliki harapan agar siswa menyadari potensi yang ada pada dirinya. Selain itu, dengan adanya pembelajaran tentang TIK dapat meningkatkan minat siswa untuk terus mengembangkan dirinya sehingga siap menghadapi masa yang akan datang.

Penelitian ini dilakukan di SMK Negeri 3 Yogyakarta pada bulan Februari 2019. Data yang dianalisis pada penelitian ini berupa data angket minat belajar siswa terhadap pembelajaran teknologi informasi dan komunikasi dalam hal ini pada Mata Pelajaran Simulasi dan Komunikasi Digital kelas X SMK. Subjek penelitian adalah semua siswa kelas X Program Keahlian Teknik Komputer dan Jaringan (TKJ) di SMK Negeri 3 Yogyakarta dengan jumlah 30 siswa yang terdiri dari 4 siswa putri dan 26 siswa putra pada Tahun Ajaran 2018/2019.

Hasil penelitian diperoleh dari data minat belajar yang dianalisis dari data angket tentang minat belajar siswa ditinjau dari faktor internal. Faktor internal diamati berdasarkan pada tanggapan siswa mengenai kondisi fisiologis yaitu keadaan fisik dan psikologis yang berupa kecerdasan dan bakat seseorang yang mempengaruhi pada minatnya mengikuti pembelajaran teknologi informasi dan komunikasi. Data angket tentang minat belajar siswa ditinjau dari faktor eksternal yang berisi kondisi sosial dan nonsosial yang mempengaruhi

minatnya belajar dalam hal ini belajar tentang teknologi informasi dan komunikasi. Kondisi sosial dan nonsosial ini terdiri dari lingkungan sekitar siswa seperti keluarga, teman, materi pembelajaran, ataupun kondisi tempat siswa belajar teknologi informasi dan komunikasi. Data angket dari pendekatan belajar. Pada bagian ini disajikan pertanyaan tentang cara mengajar guru dikelas sehingga materi yang menjadi tujuan pembelajaran dapat tersampaikan dengan baik. Dari hasil analisis diperoleh data statistik deskriptif yang disajikan pada Tabel 2.

Berdasarkan hasil analisis data, dilakukan pengkategorian berdasarkan analisis data distribusi frekuensi. Pengkategorisasian minat belajar siswa dibagi menjadi tiga bagian yaitu minat internal, minat eksternal, dan pendekatan belajar. Pada hasil analisis data minat internal, minat eksternal, dan pendekatan belajar dilakukan pengkategorian dalam tiga bentuk kategori yaitu kategori minat tinggi, sedang, dan rendah. Pengkategorian minat belajar bertujuan untuk mempermudah pengambaran minat yang ada pada diri seseorang. Dalam hal ini, pengkategorisasian dilakukan untuk mengetahui kategori minat siswa pada saat pembelajaran teknologi informasi dan komunikasi.

Hasil analisis statistik data minat internal siswa dalam pembelajaran teknologi informasi dan komunikasi diperoleh nilai rata-rata yaitu 63,1; nilai terendah 55; nilai tertinggi yaitu 75; dan Standar Deviasi 5,06. Nilai (M+ SD) = 68,16 dan nilai (M - SD) = 58,03. Tabel 3 merupakan gambaran distribusi frekuensi minat internal.

Berdasarkan analisis data minat internal dapat dilihat jika sebagian besar siswa memiliki minat yang sedang yaitu sebesar 66,66%. Sebagian besar siswa dengan kategori sedang setuju untuk mengembangkan ketertarikannya dalam pembelajaran teknologi informasi dan komunikasi. Namun, banyak siswa tidak setuju untuk tidak mengalihkan perhatian

Tabel 2
Statistik Deskriptif Minat

Indikator	Jumlah	Rata-rata	Standar Deviasi	Nilai Terendah (Min)	Nilai Tertinggi (Maks)
Internal	1893	63,1	5,06	55	75
Eksternal	341	11,36	2,05	6	15
Pendekatan Belajar	361	12,03	1,51	8	15

Tabel 3
Distribusi Frekunsi Minat Internal

No	Kategori	Rentang Skor	Frekuensi	Prosentase	
				Relatif	Kumulatif
1	Tinggi	75 – 69	4	13,34 %	13,34 %
2	Sedang	68 – 59	20	66,66 %	80,00 %
3	Rendah	58 – 55	6	20 %	100 %
Total			30	100 %	

pada saat pembelajaran berlangsung. Dengan kata lain, pada saat pembelajaran berlangsung siswa lebih tertarik dengan hal lain daripada pembelajaran yang sedang berlangsung, khususnya pembelajaran TIK. Komputer yang disediakan digunakan untuk hal lain selain pembelajaran. Fokus siswa dalam pembelajaran cenderung bercabang. Untuk mengatasi hal ini, guru tidak hanya berfokus pada materi yang disampaikan tetapi juga kesiapan siswa dalam memperoleh materi. Guru dapat memberikan himbauan untuk mematikan komputer pada saat pembelajaran berlangsung. Guru dapat memberikan umpan balik kepada siswa agar tetap fokus pada pembelajaran.

Selain itu, terdapat sebagian siswa yang tidak setuju untuk mendapatkan ilmu yang bermanfaat dalam pembelajaran teknologi informasi dan komunikasi. Hal ini berati sebagian besar siswa merasa aman dan kurang mengembangkan kemampuannya. Kesadaran akan manfaat pembelajaran yang didapat cenderung diabaikan. Sebagian besar siswa merasa bahwa menciptakan kesadaran pada dirinya masih belum diperlukan. Siswa cenderung mengerjakan yang menjadi tuntutan. Hal ini juga diperkuat dari pernyataan siswa dengan memilih menolak untuk diberi tugas yang sulit. Siswa menolak diberikan tugas yang sulit. Hal ini menandakan siswa kurang tertarik mengembangkan kemampuannya. Pemberian tugas yang sulit semestinya lebih mendorong siswa untuk terus mencoba memecahkan dan mengasah kemampuannya dengan terus mencari informasi terkait tugas yang diberikan.

Pada saat pembelajaran, masih banyak siswa setuju untuk lebih memilih diam daripada menanyakan dan mencari informasi terkait materi yang disampaikan. Dengan kata lain, pada saat memperoleh materi, siswa menjadi cenderung apa adanya tanpa mengembangkan pengetahuannya. Kesadaran siswa untuk mengembangkan pengetahuannya masih sangat diperlukan. Kesadaran untuk meningkatkan kemampuan dapat dilakukan guru dengan pemberian dorongan kepada siswa terkait masalah yang sedang menjadi perhatian siswa yaitu dengan memberikan gambaran tentang kehidupan yang akan datang dan peran ilmu yang sedang dipelajari di masa yang akan datang. Dilihat dari minat kategori tinggi, hanya sebagian kecil siswa yang memiliki minat internal yang tinggi yaitu sebesar 13,34%. Dengan kata lain, minat siswa dari segi internal masih perlu ditingkatkan lagi mengingat persentase minat tinggi masih kecil.

Peringkat kedua adalah minat rendah yaitu sebesar 20%. Hal ini sangat beresiko mempengaruhi siswa lain yang memiliki minat diatasnya. Jumlah siswa yang tidak setuju lebih banyak daripada siswa yang setuju untuk berperan aktif dalam pembelajaran. Berdasarkan pernyataan pada angket, sebagian besar siswa tidak setuju untuk berperan aktif dalam pembelajaran dan hanya sedikit siswa yang setuju untuk aktif dalam pembelajaran. Pembelajaran berjalan dengan baik apabila siswa dapat berperan aktif kegiatan pembelajaran. Keaktifan siswa dalam pembelajaran menjadi tanda besarnya ketertarikan siswa dalam pembelajaran. Selain itu, kesehatan pada diri menjadi hal yang perlu diperhatikan. Masih banyak siswa tidak setuju untuk menjaga kesehatan dengan rutin berolahraga. Fisik yang baik akan mudah menerima materi pelajaran yang berlangsung, khususnya pembelajaran teknologi informasi dan komunikasi.

Peningkatan minat perlu dilakukan siswa dengan harapan siswa tersebut lebih mengembangkan minat internal yang berupa kesadaran tentang fisiologis yag berupa kesadaran fisik dan psikologis yang

berupa kecerdasan dan kemampuan siswa menghadapi sesuatu. Kesadaran fisiologis dibentuk dengan cara menumbuhkan kesadaran menjaga pola makan, waktu istirahat, dan kesehatan pada diri siswa agar pada saat pembelajaran berlangsung kondisi badan dalam keadaan yang baik. Contohnya, seorang siswa yang memiliki minat tinggi dalam pembelajaran, ia berusaha keras menjaga pola makan sehingga fokus menerima materi tanpa gangguan rasa lapar. Kondisi badan yang baik membuat materi yang didapat pada saat dipahami secara sempurna. Selanjutnya, untuk pembentukan kesadaran psikologis perlu dilakukan penumbuhan ketertarikan materi pada saat pembelajaran berlangsung. Guru memberikan materi dengan cara yang menarik setiap kali pertemuan agar siswa lebih tertarik dalam pembelajaran. Dengan pemberian materi yang menarik, siswa akan menfokuskan perhatian secara sukarela dalam pembelajaran. Secara tidak sadar, perhatian siswa tersebut dapat meningkatkan kualitas hasil belajar pada proses pembelajaran yaitu pembelajaran teknologi informasi dan komunikasi.

Hasil penelitian ini sejalan dengan penelitian Nurhasanah dan Sobandi (2016) yang menyimpulkan bahwa perhatian dan ketertarikan dalam pembelajaran dipengaruhi oleh minat siswa dalam pembelajaran sehingga pembelajaran dapat optimal. Selain perhatian dan ketertarikan dalam pembelajaran, minat siswa juga dipengaruhi oleh motivasi belajar dan pegetahuan yang siswa miliki tentang materi yang didapat saat pembelajaran. Selanjutnya, penelitian yang dilakukan Pambudi (2015) yang menyimpulkan kondisi fisik pada saat pembelajaran berlangsung mempengaruhi hubungan yang signifikan terhadap prestasi belajar yaitu sebesar 50,8%. Siswa menjaga kondisi fisik agar siswa dapat memperoleh prestasi yang memuaskan pada saat pembelajaran berlangsung.

Data yang dianalisis adalah berupa data minat eksternal. Berdasarkan analisis statistik data minat eksternal siswa dalam pembelajaran teknologi informasi dan komunikasi diperoleh; nilai rata-rata yaitu 11,36; nilai terendah 6; nilai tertinggi yaitu 15; dan Standar Deviasi 2,05. Nilai (M + SD) = 13,41 dan nilai (M - SD) = 9,31. Distribusi frekuensi minat eksternal disajikan pada Tabel 4.

Berdasarkan data hasil analisis diperoleh bahwa pada minat eksternal, sebagian besar siswa memiliki minat yang sedang yaitu sebesar 66,66%. Siswa yang memiliki minat tinggi dan rendah seimbang yaitu sebesar 16,67%. Kategori minat tinggi masih amat kecil. Masih terdapat banyak siswa yang tidak setuju bahwa keluarga berperan dalam penumbuhan minat. Siswa beranggapan bahwa pada saat pembelajaran berlangsung keluarga belum memberikan

Tabel 4
Distribusi Frekuensi Minat Eksternal

No	Kategori	Rentang Skor	Frekuensi	Prosentase	
				Relatif	Kumulatif
1	Tinggi	15 - 14	5	16,67 %	16,67 %
2	Sedang	13 - 10	20	66,66 %	83,33 %
3	Rendah	9 - 6	5	16,67 %	100 %
Total			30	100 %	

pengaruh yang banyak. Siswa merasa belum terlalu paham manfaat yang diperoleh ketika mengikuti pembelajaran dengan sungguh-sungguh dapat berdampak pada nasib keluarga di masa yang akan datang. Peran teman-teman sebaya dalam kelas juga belum memberikan dampak yang baik dalam peningkatan minat belajar. Siswa menjawab tidak sejutu pada pernyataan teman mempengaruhinya untuk lebih giat belajar. Iklim lingkungan kelas yang bersaing masih kurang. Dapat dikatakan jika teman sekelas belum memberikan pengaruh yang berarti dalam peningkatan minat pada saat pembelajaran teknologi informasi dan komunikasi.

Selain itu, masih terdapat siswa yang tidak setuju bahwa sumber belajar membuatnya tertarik dalam pembelajaran. Pembelajaran cederung membosankan dan tidak berpengaruh banyak. Berdasarkan pernyataan siswa dapat dikatakan bahwa sebagian siswa beranggapan lingkungan sosial dan nonsosial seperti keluarga, sekolah, masyarakat, ataupun materi yang diperoleh pada saat pembelajaran belum berpengaruh dalam pengembangan minat. Hal ini dapat dilihat juga dari hasil analisis bahwa masih ada siswa yang memiliki minat rendah. Pengembangan dan dukungan lingkungan diharapkan dapat meningkatan minat belajar siswa dalam mempelajari materi, khususnya materi tentang teknologi informasi dan komunikasi.

Kerja sama yang baik antara pihak sekolah dan keluarga untuk meningkatkan minat perlu dilakukan. Sekolah dan keluarga memberikan gambaran tentang manfaat masa depan diharapkan dapat membuat siswa lebih tertantang untuk meningkatkan kemampuannya. Dengan demikian, minat yang ada pada diri siswa akan meningkat. Selain itu, guru yang baik dapat menghubungkan sumber-sumber belajar yang berupa materi pembelajaran dengan kondisi yang hangat atau yang sedang ramai dibincangkan. Sebagai contoh dalam pembelajaran teknologi informasi dan komunikasi, guru memberikan gambaran awal tentang perkembangan teknologi yang mengakibatkan manusia menginginkan kemudahan. Kemudian, menggambarkan inovasi *e-book* yang membuat seseorang dimudahkan. Saat ini, pengembang dari *e-book* masih sedikit atau sangat kurang. Dengan contoh tersebut, kesadaran siswa untuk belajar teknologi informasi dan komunikasi akan terpupuk. Siswa lebih antusias dalam mengikuti pembelajaran di sekolah karena masalah yang dihadapi sangat dibutuhkan untuk saat ini dan masa yang akan datang.

Hasil penelitian ini sejalan dengan penelitian yang dilakukan Palangda (2017) yang menyatakan bahwa terdapat pengaruh positif antara minat belajar dengan lingkungan yang ada di sekitar siswa. Lingkungan yang dimaksud adalah lingkungan keluarga dan lingkungan sekolah. Data minat dianalisis berdasarkan pendekatan belajar yang digunakan dalam pembelajaran. Berdasarkan analisis statistik data, data pendekatan belajar pada minat belajar siswa dalam pembelajaran teknologi informasi dan komunikasi diperoleh nilai rata-rata yaitu 12,03; nilai terendah 8; nilai tertinggi yaitu 15; dan Standar Deviasi 1,51. Nilai (M+ SD) = 13,55 dan nilai (M - SD) = 10,51. Tabel 5 menyajikan distribusi frekuensi minat eksternal.

Dari hasil analisis dapat dilihat jika sebagian besar siswa memiliki minat yang sedang yaitu sebesar 70% atau sejumlah 21 siswa. Hal ini sangat perlu ditingkatkan. Semakin pesat teknologi membuat seseorang harus terus belajar dan berkembang. Berdasarkan data yang diperoleh pada saat penelitian masih terdapat siwa tidak setuju bahwa pada saat pembelajaran berlangsung guru menggunakan model/

Tabel 5
Distribusi Frekuensi Minat Eksternal

No	Kategori	Rentang Skor	Frekuensi	Prosentase	
				Relatif	Kumulatif
1	Tinggi	15 - 14	4	13,33 %	13,33 %
2	Sedang	13 – 11	21	70 %	83,33 %
3	Rendah	10 - 8	5	16,67 %	100 %
Total			30	100 %	

metode pembelajaran yang menarik. Pembelajaran menjadi membosankan dan siswa tidak tertarik mengikuti pembelajaran dikarenakan guru tidak menginovasi model pembelajaran. Peningkatan minat belajar berdasarkan pendekatan belajar dapat dilakukan dengan memberikan inovasi baru terhadap pembelajaran.

Sejalan pada saat dilakukan observasi, sebagian besar siswa berpendapat jika guru kurang menginovasi pembelajarannya. Pada saat pembelajaran berlangsung, guru lebih membekali siswa terhadap teori-teori tentang teknologi informasi dan komunikasi. Penyampaian informasi terkait materi yang diajarkan masih menggunakan media yang minim seperti *slide* persentasi. Informasi yang diterima pun sebagian besar mengacu pada ranah pengetahuan. Keterampilan untuk menciptakan hal baru pada saat pembelajaran teknologi dan informasi masih sangat minim. Dengan kata lain, siswa setuju agar guru meningkatkan model/metode pembelajaran. Untuk menambah wawasan bagi guru, perlu dilakukan pelatihan atau diklat khusus agar pembelajaran lebih inovatif, menarik, dan efektif.

Pembelajaran yang menarik dapat dilakukan dengan mengkolaborasi pembelajaran dengan model-model pembelajaran yang sesuai dengan pokok bahasan sehingga siswa lebih antusias dalam pembelajaran. Antusias siswa yang meningkat dapat meningkatkan hasil belajar. Penerapan model/metode pembelajaran secara tidak sadar dapat meningkatkan kualitas dan relevansi pembelajaran.

Hasil penelitian ini sejalan dengan penelitian yang dilakukan Nurfazar, Rokhayati, dan Lidinillah (2016) yang menyatakan bahwa minat belajar siswa yang mendapat perlakuan dengan metode pembelajaran dramath lebih besar dibandingkan dengan minat belajar siwa yang tidak mendapat perlakuan dengan model/metode dramath. Dengan kata lain, metode/model pembelajar berpengaruh terhadap hasil yang didapat pada saat pembelajaran berlangsung.

Selain itu, peningkatan suasana kelas yang kondusif juga perlu ditingkatkan. Sebagian besar siswa setuju untuk meningkatkan suasana yang kondusif. Suasana yang kondusif membuat siswa nyaman mengikuti pembelajaran. Selain itu, suasana yang kondusif memudahkan siswa memperoleh materi yang disampaikan pada saat pembelajaran teknologi informasi dan komunikasi. Perlu adanya peran aktif guru bersama siswa untuk meningkatkan suasana yang kondusif tersebut.

Jumlah persentase tertinggi peringkat kedua adalah kategori minat rendah yaitu sebesar 16,67% dan kategori dengan persentase paling kecil adalah kategori tinggi yaitu sebesar 13,33%. Dengan

kata lain, indikator minat pendekatan belajar menjadi masalah yang serius dan memerlukan penanganan yang berati dan segera agar siswa lebih menumbuhkan ketertarikan saat mengikuti pembelajaran teknologi informasi dan komunikasi.

Keseluruhan hasil penelitian di atas menujukan bahwa peningkatan minat belajar dalam pembelajaran teknologi informasi dan komunikasi sangat perlu dilakukan. Minat yang baik berpotensi meningkatkan hasil belajar. Hasil penelitian ini sejalan dengan beberapa penelitian terdahulu yang berujung pada kesimpulan peningkatan minat belajar dapat dilakukan untuk menumbuhkan kesadaran pentingnya minat pada siswa pada pembelajaran teknologi informasi dan komunikasi. Minat yang baik akan mempengaruhi prestasi belajar pada saat pembelajaran berlangsung (Nurhasanah & Sobandi, 2016; Pambudi, 2015). Penelitian Sirait (2016) menyimpulkan bahwa terdapat hubungan yang signifikan antara minat belajar terhadap presetasi belajar yaitu sebesar 49,8%. Penelitian yang dilakukan Palangda (2017) yang menyatakan bahwa terdapat pengaruh positif antara minat belajar dengan lingkungan. Lingkungan yang dimaksud adalah lingkungan keluarga dan lingkungan sekolah.

SIMPULAN

Berdasarkan hasil penelitian dan pembahasan dapat disimpulkan bahwa pembelajaran teknologi informasi dan komunikasi bagi siswa kelas X SMK ditinjau dari minat belajar perlu ditingkatkan. Perlu ada penangan serius antara sekolah berkerja sama dengan keluarga untuk meningkatkan minat siswa dalam pembelajaran teknologi informasi dan komunikasi. Sebagian besar siswa masih memiliki minat yang sedang dalam mempelajari teknologi informasi dan komunikasi. Minat sedang cenderung membuat siswa lebih santai dan kurang mengembangkan kemampuannya.

Ditinjau dari minat internal sebagian besar siswa memiliki minat sedang. Hal ini berati sebagian besar siswa merasa aman dan kurang mengembangkan kemampuannya. Hanya sebagian kecil yang memiliki minat internal yang tinggi. Minat tinggi ini memiliki persentase paling kecil dibandingkan dengan kategori lainya. Hanya sebagian kecil siswa merasa ketertarikan yang tinggi pada pembelajaran. Dengan kata lain, minat siswa dari segi internal masih perlu ditingkatkan lagi mengingat persentase minat kategori tinggi masih kecil. Peringkat kedua diduduki pada minat rendah. Hal ini sangat berisiko mempengaruhi siswa lain yang memiliki minat diatasnya. Peningkatan minat perlu dilakukan agar siswa lebih mengembangkan minat internal yang berupa kesadaran tentang fisik dan psikologis yang berupa kecerdasan dan kemampuan siswa meng-hadapi sesuatu.

Kesadaran pada minat internal dapat dilakukan dengan mendukung agar menjaga kesehatan dan kebersihan fisik yang berupa raga sedangkan untuk menumbuhkan kesadaran psikologis dapat dilakukan dengan pengarahan siswa untuk sadar akan teknologi informasi dan komunikasi agar mampu bertahan di masa selanjutnya. Ditinjau dari minat eksternal, sama seperti minat internal. Sebagian besar siswa memiliki minat yang sedang. Siswa yang memiliki minat tinggi dan rendah seimbang. Kategori minat tinggi masih amat kecil. Sebagian siswa beranggapan bahwa lingkungan sosial dan nonsosial seperti keluarga, sekolah, masyarakat, ataupun materi yang diperoleh pada saat pembelajaran belum berpengaruh dalam pengembangan minatnya. Hal ini dapat dilihat juga dari data hasil analisis bahwa masih ada siswa yang memiliki minat rendah. Pengembangan dan dukungan lingkungan diharapkan dapat meningkatan minat siswa

dalam mempelajari materi, khususnya materi tentang teknologi informasi dan komunikasi. Pada minat eksternal perlu adanya kesadaran dari lingkungan untuk mendukung perkembangan minat siswa yang dapat berpengaruh di masa depan. Akan tetapi, pengaruh lingkungan tidak dapat diubah dengan mudah. Setiap manusia memiliki karateristik sendiri-sendiri. Perlu adanya kesadaran yang matang dari setiap anggota dalam lingkungan untuk sadar teknologi.

Selanjutnya, ditinjau dari pendekatan belajar sebagian besar siswa memiliki minat yang sedang. Dengan kata lain, peningkatan minat belajar dengan pendekatan belajar sangat perlu ditingkatkan. Semakin pesat teknologi membuat seseorang harus berkembang. Peningkatan kemampuan siswa dapat dilakukan dengan memberikan suguhan atau tantangan yang baru. Sebagian besar siswa berpendapat jika guru kurang menginovasi pembelajaran. Informasi yang diterima siswa pada saat pembelajaran sebagian besar mengacu pada ranah pengetahuan. Keterampilan untuk menciptakan hal baru pada saat pembelajaran teknologi dan informasi masih perlu ditingkatkan. Untuk mengatasi masalah tersebut, perlu adanya kegiatan untuk menambah wawasan guru yaitu dengan diadakan diklat atau pelatihan khusus agar pembelajaran lebih inovatif, menarik, dan efektif.

Pembelajaran yang menarik dapat dilakukan dengan menerapkan berbagai model pembelajaran sehingga siswa lebih antusias. Jumlah persentase tertinggi kedua pada pendekatan belajar pada kategori minat rendah dan kategori dengan persentase paling kecil adalah kategori tinggi. Dengan kata lain, indikator minat pendekatan belajar menjadi masalah yang serius dan memerlukan penanganan yang berarti agar siswa lebih tertarik mengikuti pembelajaran teknologi informasi dan komunikasi.

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EFFECTS OF POINT-PIN REWARD METHOD TOWARDS STUDENTS' INTEREST AND ACQUISITION

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Abstract

This study was aimed at determining the effect of the point-pin reward method in Biology cross-specialization learning activities towards students' interest and acquisition in the 11th-grade social science class in State Senior High School 1 Sentolo. The research was a quasi experimental study using a pre-test and post test non-equivalent control group design. The number of participants consisted of 41 students divided into 2 classes, the control class and the experimental class. Data for students' interest in learning were collected using interest questionnaires analyzed using a Likert scale. Data for students' acquisition were obtained by analyzing written tests. Research data were analyzed using independent-samples *t* test. The results of this study indicate that: The point-pin reward method has significant effects on the students' interest and acquisition in the learning activities of biology cross-specialization lessons.

Keywords: *point-pin reward method, learners' interest, learners' acquisition*

INTRODUCTION

The background of the study begins with the government's efforts to change the national curriculum at the levels of education in Indonesia, including the content standard (CS), basic competency standard (BS), graduating standard (GS), process standard (PS), and assessment standard (AS) (Permendikbud Numbers 22 and 23, 2016). With the change of curriculum, the purpose of national education pursuant to UU No 20 year 2003 can be expectedly achieved.

The curriculum has a number of activities to master and develop the learning materials so that they have a good influence on students' learning. (Slameto, 2010, p. 65). The curriculum of the State Senior High School (SSHS) is developed under the format of the national curriculum in establishing national standards as a minimum quality of learners including attitudes, knowledge, and skills. In the implementation of the 2013 curriculum, SSHS 1 Sentolo has 2 major classes consisting of MIPA (mathematics and natural Sciences) and IPS (social sciences). The cross-specialization subjects that can be selected by IPS students are mathematics, biology, physics, and chemistry.

The problems in the learning activities of cross-specialization biology in the social class is lack of participation, students' response and the students' acquisition in biological learning activities. This situation makes the teachers work extra to improve the quality of learning.

By the implementation of the point-pin reward method in learning activities, students are expected to be actively motivated in participating in the learning process. The point-pin reward point-pin is still rarely applied by teachers, especially at the high school level. With the application of this method, it is expected to increase activities to influence the interest and

learning outcomes of students. Lee and Fradd stated that teachers need to appreciate students during introducing scientific views to students (Zain, 2017) so that they acquire growing interest, confidence, and success expectations. They will enjoy more academic assignments and learn more when they feel competent (National Research Council, 2003).

Reward is something that is given to someone when making good behavioral changes or doing a good job. Lucrative rewards can attract and retain talent (Delves, 2004, pp. 22-32) Students must also be given time to develop interest in the material (Downing, 1997, pp. 7-39).

Hover stated that external rewards are necessary because they are effective at stimulating actual interest. Rewards can be used to create self-motivation and self-discipline (Hamalik, 2015, p. 163). Reward-giving imbalance will result in academic fatigue and learning saturation in students (Lee, Puig, & Lee, 2011). If the work is satisfying, then students are interested in exploring new things, thus becoming successful and valued for their contributions (Chahal, 2008, pp. 92-121). Awards are used to support participants' engagement so they are motivated and productive (Armstrong & Brown, 2006, pp. 2- 3). Students who are regularly and systematically rewarded tend to work better (Slameto, 2010, p. 181).

Reward is an educational tool used to educate students to feel happy during learning activities because what they do is rewarded (Purwanto, 2011, p. 182). The function of giving gifts to strengthen individual opinions/beliefs that the actions performed are true or justified (Arikunto, 1990, p. 166).

The special purpose of reward giving is based on the beliefs of what is appreciated and wants to achieve, creating values, supporting the development of work culture, delivering the message, behaviour and correct results, assisting in the process of motivating people and Achieving high involvement (Armstrong & Brown, 2006, pp. 7-8) and to improve and improve students' achievement (Purwanto, 201stated that point-pin reward is a reward that contains praise and is realized in the form of signs or symbols that are fun and interesting (Hamid, 2006). The reward functions to make students proud and improve their participation in learning activities. Reward conditions include knowing the right students and apprecising them appropriately, do not cause jealousy and envy, do not reward too often, do not give a reward before there is work achievement, the reward is not wages for students (Purwanto, 2011, p. 184). The Reward principle must be effective and adjusted to the level of student development. The law of study that applies to adult learners is attributed to the learning and relevant experiences of life (Danim & Khairil, 2014, p. 128).

External stimulation, in an interesting learning situation, can stimulate the emergence of interest (Laine, Veermans, Lahti, & Veermans, 2017). Interesting is a sense of love and attachment to something or an activity or form of acceptance of a relationship between yourself and something outside yourself, when it becomes stronger then the interest is getting bigger (Slameto, 2010, p. 180).

Expression of interest can be in the form of statement, participation in an activity, and great attention to a particular subject. Interest is not brought from birth but obtained from learning outcomes and in social relationships in learning of the psychiatric conditions is indispensable in the learning process of teaching especially in paying attention to an object.

Behaviors are influenced by two components namely cognitive components (factual knowledge, concept, and skill) and motivational components (attitudes, psychological needs) (Volet, 2001, p. 17). Hidi & Renninger stated that it depends on the level of previous individual knowledge and is supported by external stimuli occurring (Laine, *et al*., 2017).

Acquisition is the ability to minister and understand material until students can redescribe well-received material (Depdikbud, 1990). Students acquisition is used as a guideline to know the extent of students' acquisition of the lesson material taught by the teacher in the learning activities.

The assessment is conducted by measuring the achievement of basic competencies (BC) on core competencies (CC), using minimal submission criteria (MSC), which is done in a planned and ongoing basis, further analyzed to determine the level of achievement of students, as well as determining follow-up and feedback to improve the learning process. The analysis results of daily replay assessment using reference of predefined criteria in MSC (Sani, 2016, pp. 63-66). The purpose of this analysis is to determine whether students have reached MSC and can continue to follow the next BC study or still need improvement. Assessments are used to manage and improve learning progress by providing information to monitor student progress, make instructional decisions, evaluate student achievement, and evaluate programmes (Nessel, 2007, p. 16).

Students will benefit from good judgment at school and learn that educators care. If it is responsible for students ' learning, performance increases (Woodrow, 2015, pp. 25-78). Students acquisition includes academic achievement based on the learning outcomes according to the curriculum in this school To determine students' learning(individual) delivery can be calculated using the following equation.

$$KB = \frac{T}{T_1} \times 100\%$$

Note:
KB = learning Submission
T = number of scores earned by students
T1 = Total score Number

Each student is said to achieve a learning submission if the proportion of the correct answer to students is ≥ 65%, and a class is said to achieve a learning unity if there are ≥ 85% of students who have completed their studies (Trianto, 2011). The absorbent power results can be seen from the percentage of students who have achieved minimal submission criteria compared to all students who take the exam.

The human reproductive system is a system of living creatures that have the ability to breed, so that the species of living creatures are able to survive by forming new organisms. In humans, the reproduction occurs sexually. The human reproductive system includes reproductive organs, reproductive mechanisms, menstrual cycles, fertilization, pregnancy, birth processes, and abnormalities/diseases of the reproductive system (Pratiwi, Maryati, Srikini, & Bambang, 2006, p. 224).

METHOD

The type of research conducted was a quasi experiment with a non-equivalent pretest-postest control group design. The research was performed at SSHS 1 Sentolo, Kulon Progo regency, Yogyakarta from April to May 2018 in Social Science 11th grade classes. The purpose of the study is to know the influence of the point-pin reward method on the students' interest and acquisition in the cross-specialization biological learning. The subjects of the

study were 41 students of the social science 11th grade class. Prior to the implementation of the study, observation activities and pre- research activities were conducted. Data collection techniques were done by non-test techniques (questionnaires for students' interest before and after the learning activities), and test techniques to get the students' acquisition data from the pre-test and post test results.

This research instruments were in the form of learning devices for both classes along with the reward point-pin devices for the experimental class, measurement of students' interest using the Likert scale with a choice of 5 student responses, namely strongly agree (SA), agree (A), undecided (U), disagreeing (D), and strongly disagree (SD) (Sugiyono, 2015, pp. 134-135). For the students' acquisition instruments, the assessment tools ranged from grids, evaluation sheets, answer keys, and results of pretests and postest analyses. The instruments were used after a validation and reliability test we waswas test.

Data analysis techniques consisted of descriptive analysis and inferential analysis. The descriptive analysis was used to provide general explanation of research implementation and present the measurement data of table and diagram form. The calculation of descriptive statistics and inferential analysis using the help of SPSS 22.00 for Windows program. The inferential analysis was used to test the research hypothesis, after the prerequisite test was fulfilled, namely the normality test and the homogenity of the data group variant followed up by conducting an independent sampels *t*-test. Next to know the difference in influence of the point-pin reward method for acquisition in both classes, a gain score test was performed using SPSS 22.00 for Windows.

RESEARCH RESULTS AND DISCUSSION

The cross-specialization biological material is no different from biological material for interest in grade XI of MIPA. Generally, the material is in the even semester and includes the structure and function of organs, mechanisms of organ systems, as well as disorders, diseases or abnormalities of the organ system. Problem-based learning improves the ability to optimize students' thinking through systematic group or team work processes, so that students can empower, hone, test, and continuously develop their sustainable skills hormones that play a role in the development of human reproduction. In discussions within groups, students get an opportunity to respond and advise on the results of other group discussions. During this activity, they can get a reward. Students who are active in learning activities get pins. The criteria are as rollows: asking questions (red pin, score 1), answering questions answers (blue, score 2) and giving arguments (gold, score 3). This learning model shows that learning can build knowledge with others through interaction and collaboration. Learning with the reward gives a change of feeling to the learners so that it gives meaning to learners. (Watkins, Carnel, & Lodge, 2010. p. 15). Reward point-pin is given at a certain stage during the learning activities. Meanwhile, in the control class, there is a conventional learning activity without any reward giving to students. Observations of students' activities are directly recorded by the observer. By a student's activity is meant an active participation starting from the inquiring until the opinion is recorded in the observation sheet. In the experimental classes, students who participated actively got a point for direct Pin reward, while in the control class, earning points did not get rewarded. The implementation

of the learning activities in both classes consists of introduction, core activities and closing. At the introductory stage consists of opening, motivation, the exception and delivery of learning objectives. In the introductory phase of experiment class, the teacher provides an explanation on the implementation of the pin reward method to students who play active roles during the learning activities.

In the core learning activities, students get the opportunity to earn the point reward. The learning material in this activity is a media presentation on the signs of secondary genital development in both men and women. Students are asked to formulate questions about male and female reproductive organs as well as their relationship to puberty. In addition to the media, images of spermatogenesis and the development of ovarian follicles are displayed also. This activity is guided by a participant's activity sheet. Students conduct discussions in the group. Students also collect information from the literature and the Internet media to add information about the relationship between structure and function of reproductive organs in the events of spermatogenesis and oogenesis, as well as hormones that play a role in the development of human reproduction.

In the discussions between groups, students get an opportunity to respond and advise on the results of other group discussions. During this activity, they can get a reward. Students who are active in learning activities get pins. When a student asks a question, a red pin is given (score 1), answers a question, a blue pin is given (score 2), and gives an argument, a gold pin (score 3).

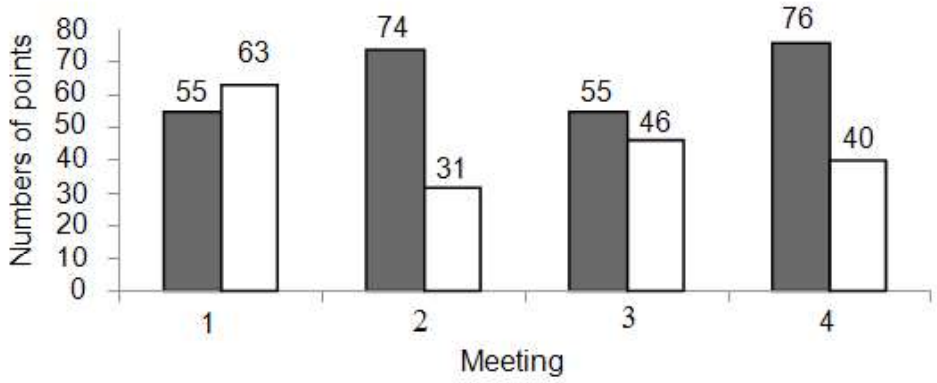
The point-pin reward in the next meeting is conducted from the introductory stage to the closing activity. The material for the second to the fourth meeting is about menstrual cycles, fertilization, pregnancy and childbirth, and diseases/abnormalities that interfere with the reproductive system which include mechanisms, symptoms, causes, how to cure, how to prevent, the risk of illness, and the impacts of free association. Rewards can be earned by students during group discussions, class discussions, to conclusions and giving their ideas or opinions.

Students are given the opportunity to explore vast information from either experience, events that occur in the environment, or from media sources of free association, starting from the acquisition, causal factors, as well as its impact on the health of human reproductive devices. With the active participation of students in the learning activities, learning becomes meaningful, which brings knowledge and cognitive processes that students need in problem solving (Bloom, Englehart, Walker, Furst, & Krathwohl, 2010, p. 97). Students can illustrate and plan problem solving solutions and apply them. It is evident that during discussions between groups, ideas arise to solve problems related to the human reproductive system. The number of pins the student acquired is seen at the end of this fourth learning implementation. A star pin is attached to the reward board. The acquisition in the control class is quite noted by the observer. The average point result in both classes can be seen in the Figure 1.

The first acquisition of points in the control class was more than the point of acquisition in the experimental class. But after four times of learning, it is revealed that the average student point accrual in the experimental class is higher than the average student point accrual in the control class.

Furthermore, in the descriptions of the students' interest measurement results, each class experienced an average score increase

Figure 1. Students' Point Acquisition



in learners from the initial condition that was before the learning activities of the final condition after learning was performed. This can be seen in Table 1.

The average interest in the experiment class increased by 8.93% while the average rate of interest in the control class was 1.70%. From these results, the interest rate increase in the experiment class is greater than that of the control class score. The description presented in the study is to describe data that has been collected and does not aim to make conclusions that apply to the public or generalization (Sugiyono, 2015, p. 208).

Further testing is test normality and test homogenization of interest measurement data, as a prerequisite for inferential analysis. From the prerequisite test result, it is known that the students' interest measurement data in the experiment class (0.196) and the control class (0.462) have a significance value greater than 0.05; so the *Ho* is accepted, which means that the distribution of the students' interest data is normal. And the significance value of the test homogenity variant of the student interest measurement data group (0.466) is greater than the equivalent of 0.05 significance, so the *Ho* is accepted, meaning that students' interest data have a homogeneous variant. Further hypotheses is conducted using the independent-sample *t*-test that. The results can be seen in the Table 2.

Based on the data in Table 2, it is known that the value of significance (2-tailed) is

Table 1
Description of Students' Learning Interest Measurement Results

Description	Experiment Class		Control class	
	Early	End	Early	End
Average	56	61	59	60
Average hike	8.93%		1.70%	
Highest score	65	75	70	78
Lowest score	46	51	37	44

Table 2
Independent-sample T-test Data of The Test Results of Students' Interest Measurement

Student'Interest	*T-test for Equality of Means*				
	t	*Df*	*Sig (2-tailed)*	*Mean Difference*	*Std Error Difference*
Equal variances assumed	2.488	39	0,017	4.683	1.882
Equal variances not assumed	2.442	24.211	0.022	4.683	1.918

0.017. The value of that significance is lower than the α value (0.025) so that the *Ho* is rejected which means that there is a difference in the influence of the point-pin reward method in the learning activities of biology on the cross-specialization towards students of Social Science 11th grade of SSHS 1, Sentolo, Kulon Progo. The results of measuring students' interest before and after the implementation of the learning activities show that the final interest change occurred compared with the initial interest. In the control class, the change of the initial interest and the final interest among the students with the other is not the same.

Some factors that affect students in Reward accrual include the time available to earn reward, the material presented is material that is related to the daily life of the student and the application of point-pin reward in the learning activities that have not been applied in the school. Therefore, students feel attracted by the Pin received and pasted into the Reward board. It is in accordance with the opinion of Kenneth H. Hover (Hamalik, 2015, p. 163) that the praise that comes from outside (external reward) is sometimes necessary and effective enough to stimulate the actual interest.

Williams (Sears & Pai, 2012) stated that the influence of prizes on interactions in the group will bring about a growing motivation in learning activities. As is the case in the implementation of this Reward method, there is an increase in the attention and spirit of the students in participating in the learning activities. is an increase in the attention and spirit of the students in participating in the learning activities.

Enthusiastic learning activities were conducted to motivate students for increased student interest. As a teacher must have pedagogic knowledge and ability to carry out interesting and inspiring learning activities that can improve students' knowledge.

Teachers must have the knowledge and motivation to improve students' learning optimally (Keller, Neumann, & Fischer, 2016). Students participating in the study will benefit from greater education and learning. Then there will be a posistive increase in the cognitive acquisition, more advanced problem solving skills, and their interests (Cress, Collier, & Reitenauer, 2013, p. 13). The implementation of the point-pin reward method in learning activities gives an interesting activity and aims to increase the interest of students' learning of cross- specialization biology. With the increasing interest, there can also be an increase in students' learning performance.

Chen stated that biological teachers should focus on growing, stimulating, and improving students' interest in biology, activating and safeguarding students'

enthusiasm for learning biology (Li, 2011). The learning activity with this method of point-pin reward requires the Teacher's effort to increase students' interest in biology lessons in the social class. This is demonstrated by a significant influence on students' interests.

Interest is personal, for interest will grow by itself in students. According to Herbart (Savickas & Spokane, 1999, p. 24), interest is an attitude of thought that is indicated by attention. Without awareness and attention to something, it becomes a disinterest. In accordance with this, there is the influence of point-pin reward to interest due to the awareness and attention of students during the learning activities. Although from the beginning of the majors, students have chosen a course to the social fields and the student's interest in biology lessons is initially lacking, with the application of the point-pin reward method, this learning activity can increase students' interest.

Reward in the form of material does not have a positive influence on intrinsic and extrinsic motivation. When associated with learning activities, reward points are extrinsic motivations in the form of non-material rewards (Yoon, Sung, Choi, Lee, & Kim, 2015) This reward has a positive effect on the students. Interest and motivation are two things that relate to each other. Both are necessary so that there is a smooth learning process. Pin rewards for the 11th grade students of the social science class can change the interest of students' learning of the cross-specialization biology subjects. This type of reward can foster the interest of students emerging from students themselves.

In the field of education, learning experience is important. Learning is an internal experience; so teachers cannot teach students until they want to learn. For adult students' the experience is a continuous process on the basis of the evaluation of the experienced (Danim & Khairil, 2014, p. 134). Therefore, if the reward method is carried out continuously, it will give meaningful influence on the students' willingness to study and becomes the students' experience of the learning activities.

To determine the influence of the point-pin reward method on the students' acquisition in the subjects of cross-specialization biology, it can be seen from the ability of students in the mastery of the subject matter. After analyzing the results of the written tests before and after the learning activities, the students' learning has been completed compared to all students. The MSC imposed on the 11th graders in SSHS 1, Sentolo is 70. Individual submission is known by a percentage score ratio achieved by the total score (Trianto, 2011). A description of the acquisition measurement results can be seen in Table 3.

Based on Table 3 the average scores of he pre-tests and post tests increase in both the experimental class and the control class. The standard deviation in both classes shows a decline, in which the decreases the standard deviation in the experimental class is greater than 3.768. Meanwhile, in the students' acquisition.

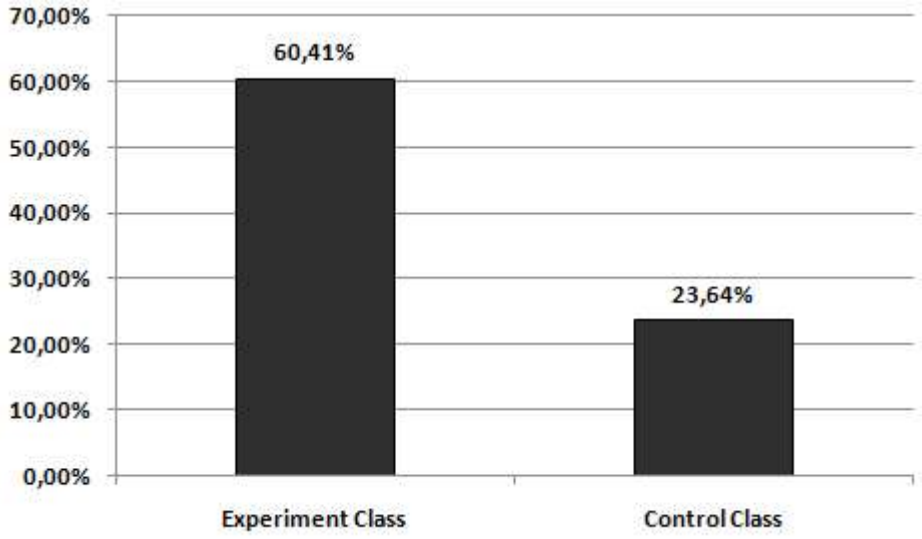
Based on the Figure 2, an increase in the grade of power of students in a class with a reward point-pin method is greater than the control class. This indicates that the awarding of rewards given to students can develop students' knowledge on a regular basis. The award encourages cognitive stability in terms of increased context or cue- keeping (Hefer & Dreisbach, 2017) and can change behavior after intensive learning by motivating individuals to increase their efforts.

Data, both of the classes improve. The increase in acquisition in the experimental

Table 3
Description of Pretest Results Measurement, Posttest, and Acquisition

Description	Experiment Class		Control Class	
	Pretest	Posttest	Pretest	Posttest
Average	42,58	68,97	50.57	61,71
Average hike	61.98%		22.03%	
Highest score	71	77	66	71
Lowest value	20	49	44	40
Standard deviation	10.724	6.956	7.304	7.083
Acquisition (%)	48	77	55	68
Acquisition power increase	60.41%		23.64%	

Figure 2. Increased of The Students' Acquisition



class is 60.41%, which is greater than the absorbent power in the control class of 23.64%. The increased acquisition in both classes can be seen in Figure 2. Rewarding efforts have proven the improvement in students' knowledge scores (Freedberg, Schacherer, & Hazeltine, 2016).

Once the pretests is tested for homogenity and normality, thestatistical test is conducted. The hypothesis for the results of the test influence of the point-pin reward method to the the students' acquisition uses the independent-sample *t*-test. The results can be seen in Table 4.

Based on Table 4, it is known that the value of significance (2-tailed) is 0.002. The value of the significance is lower than the α value (0.025); then the Ho is rejected which means that there is a significant difference in the effect of applying the point-pin reward method of biological learning activities to the student acquisition.

Table 4
Results of The Independent-Sample t-Test of Students' Acquisition

Students Acquisition	*t*-test for Equality of Means				
	T	*df*	Sig(2-tailed)	Mean Difference	Std Error Difference
Equal variances assumed	3.278	39	0.002	7.107	2.188
Equal varianc not assumed	3.273	38.567	0.002	7.107	2.171

There is an influence on the implementation of the point-pin reward method against acquisition power, and students will get a considerable achievement of learning, especially the ongoing learning activities supported for the dissemination of science culture and social awareness (Kececi, 2017). This indicates to be a significant difference after the implementation of the learning activities. The point-pin reward provides motivation that stimulates students in increasing their capacity. This is indicated by changes in behavior during the learning activities. In the same way, the results of research on awarding and punishment by Rondonuwu, Kaunang, and Rogahang (2015) indicate that awarding of rewards can improve the metacognitive skills and learning outcomes of the students.

Furthermore, a test can provide an overview of the improved learning score between before and after the point-pin reward method is applied in the learning activity. The gain score test is performed to determine the influence of the methods on the students' acquisition. The gain-score test results can be seen in the Table 5. The experiment group (M = 21.10) has a higher score change compared to the control group (M = 10.94) (Widhiarso, 2011). Furthermore, the results of the Independentt sample gain score test can be seen in the Table 6.

Based on the data in Table 6, it is revealed that data ($F = 1.371$; $p > 0.05$) is homogeneous. This means that there is no variance between the experiment group and the control group. Or it can be stated that the data variation of both groups is the same. As also known in the column of equal variances assumed, there is a difference in the level of 1 percent ($t = 3.080$; $p < 0.01$), meaning that the experiment group has a significant change compared to the control group. The description shows that the treatment given to the experiment group is successful.

Characteristic of the learning process, the learning activities are active processes, where rewards given during learning activities allow students to engage actively (Danim & Khairil, 2014, p. 121). Students' attitudes can develop or change when they

Table 5
Results of The Gain-score Test of Students' Acquisition

Gain	N	Mean	Std. Deviation	Std. Error Mean
Experimen	21	21.1010	12.26309	2.67602
Control	20	10.9400	8.39512	1.87721

Table 6
Results of The Independent Samples Gain-score Test

Gain	Levene's Test Equality for Variances		*t*-test for Equality of Means						
	F	*Sig*	*t*	df	Sig(2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Diff.	
								Lower	Upper
Equal Variances Assumed	1.371	0.249	3.080	39	0.004	10.16095	3.29851	3.48909	16.83281
Equal Variances Not Assumed			3.108	35.482	0.004	10.16095	3.26879	3.52817	16.79373

react emotionally in response to stimuli. As external motivation, rewards can be the spirit of students in the mastery of a subject matter. Learning also depends on the consequences that cause it (Slameto, 2010, p. 112).

This means that this learning activity has given a pleasant, interesting, relieving tension beneficial in expanding knowledge in efficient and durable ways. In addition, gift-giving learning activities help students in material mastery because of the support of fun and interesting learning situations. In a similar way, the pin reward gives the students an immersive experience and impression.

Measuring the achievement of students' learning outcomes in this class is conducted based on class-based assessments, where the data and information obtained is one of the evidence that can be used to measure the achievement of education programs. Class- based assessments are the process of collecting, reporting, data usage and data information about students' learning outcomes to set the level of achievement and mastery of students on basic competencies (Arifin, 2013, p. 180). An authentic assessment is used to determine the level of students' ability in competency mastery. With the significant influence of the implementation of the point-pin reward method on the acquisition of students, providing the progress of learning outcomes improves the next learning activities and stimulates students to make improvement. The increase in learning outcomes earned by students is encouraged by the sense of the needs to obtain acceptance from other individuals such as parents. Students who perform well aim to seek fame and award needs (Slameto, 2010, pp. 172-173).

Strengthening of rewards for students in high school (grades X-XII) is more focused if the presented material is closely related to their own lives (Santrock, 2011, pp. 198-254). The human reproductive system is a material inherent in the lives of students everyday, making it very supportive in the application of this method. The rewards given in the form of this pin, have not been given so that, among students, they can have a different perception. Although the students' initial interest is in the field of social sciences, the application of the point-pin reward has affected the students' interest and acquisition in biological subjects.

CONCLUSION

The results of the study concludes that the point-pin reward method is influential for the the students' interest and acquisition in cross- specialization biology learning activities.

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OPTIMALISASI *GUIDED DISCOVERY LEARNING* UNTUK MENINGKATKAN *SELF-CONFIDENCE* SISWA DALAM PEMBELAJARAN MATEMATIKA

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Abstrak

Penelitian ini dilakukan untuk mengetahui upaya optimalisasi pendekatan *guided discovery learning* untuk meningkatkan *self-confidence* siswa. Jenis penelitian ini merupakan penelitian tindakan berdasarkan model Kemmis dan McTaggart. Penelitian ini dilaksanakan terhadap 28 siswa kelas VII di level sekolah menengah pertama. Pengambilan data dilakukan dengan angket *self-confidence* dengan pengisian skala likert 1-5 sebelum dan setelah tindakan. Butir pernyataan pada angket merupakan penjabaran dari lima aspek *self-confidence*, yaitu keyakinan terhadap kemampuan matematis, keyakinan terhadap matematika, sikap optimis, rasional dan realistik, serta ketegasan dalam tindakan. Untuk mengetahui tingkat *self-confidence* siswa melalui pendekatan *guided discovery learning*. Teknik analisis data menggunakan persentase dari rata-rata hasil skor kumulatif pada setiap siklus. Tindakan dengan pendekatan *guided discovery learning* dilakukan secara bersiklus hingga mencapai peningkatkan *self-confidence* siswa kelas VII. Hasil penelitian menunjukkan bahwa pendekatan *guided discovery learning* dapat meningkatkan *self-confidence* siswa kelas VII dengan optimalisasi pada setiap langkah pembelajaran. Di samping itu, adanya peran guru sangat penting dalam meyakinkan siswa terhadap langkah-langkah penyelesaian melalui *cross-check/evaluation* sesuai kaidah penyelesaian.
Kata kunci: *self-confidence, guided discovery learning, matematika*

OPTIMIZATION GUIDED DISCOVERY LEARNING TO IMPROVE STUDENTS' SELF-CONFIDENCE IN MATHEMATICS LEARNING

Abstract

This study was conducted to optimize the guided discovery learning approach to increase students' self-confidence. This study is an action research based on the Kemmis and McTaggart model. This study was conducted on 28 grade VII students at the junior high school level. The data were collected using a self-confidence questionnaire in a Likert scale of 1-5 before and after the implementation. The statement items in the questionnaire describe five aspects of self-confidence, namely belief in mathematical abilities, belief in mathematics, optimism, rational and realistic attitudes, and assertiveness in action. Then, to determine the level of student self-confidence, the guided discovery learning approach was used. The data analysis technique used a percentage of the average cumulative score in each cycle. The action with the guided discovery learning approach was carried out on a cycle basis to achieve an increase in self-confidence of class VII students. The results show that the guided discovery learning approach could increase the self-confidence of class VII students by optimizing each step of the learning. In addition, teacher's role is crucial in convincing students of the steps for completion through cross-check/evaluation according to the rules of completion.
Keywords: *self-confidence, guided discovery learning, mathematics*

PENDAHULUAN

Self-confidence (kepercayaan diri) merupakan kepercayaan terhadap kemampuan diri dalam menggerakkan motivasi yang dimunculkan dalam tindakan untuk mencapai suatu tujuan tertentu. *Self-confidence* adalah keyakinan tentang kemampuan untuk menyelesaikan masalah dan berpikir tentang diri sendiri. Pentingnya *self-confidence* tercantum pada Permendikbud Nomor 21 Tahun 2016 yang menyebutkan bahwa di dalam pembelajaran tidak hanya fokus pada pencapaian tujuan kognitif, namun terdapat pencapaian yang bersifat afektif. Hal ini diperkuat dengan Permendikbud Nomor 68 Tahun 2013 yang menyebutkan salah satu kompetensi dasar matematika yaitu memiliki kepercayaan diri (*self-confidence*).

Siswa penting memiliki *self-confidence*. Studi internasional *The Trends in International Mathematics and Science Study (TIMSS*) (2012) menyertakan pengukuran terkait kemampuan ini. Hasil studi tersebut mencatat hanya 3% siswa Indonesia yang memiliki *self-confidence* tinggi, sedangkan sebanyak 45% termasuk dalam kategori siswa dengan *self-confidence* rendah dalam matematika.

Self-confidence merupakan ukuran nonkognitif yang lebih baik untuk melihat gambaran prestasi siswa dibandingkan dengan ukuran nonkognitif lainnya (Sritresna, 2017). Hal ini memberikan gambaran bahwa tinggi rendahnya *self-confidence* siswa sejalan dengan prestasi dan kemampuan matematikanya. Siswa dengan *self-confidence* tinggi dalam belajar matematika memiliki kemampuan lebih baik daripada siswa dengan *self-confidence* lebih rendah (May & Fray, 2010).

Lauster (Ghufron & Risnawati, 2012, p. 35-36) mengungkapkan bahwa aspek-aspek *self-confidence* meliputi: keyakinan terhadap kemampuan diri sendiri, optimis, objektif, bertanggung jawab, dan rasional, serta dan realistis. Preston (2007, p. 14) menyebutkan lima aspek pada *self-confidence* yaitu kesadaran diri, niat, berpikir positif dan rasional, berpikir kreatif saat bertindak dan bertindak. Oleh sebab itu, pada penelitian ini aspek-aspek *self-confidence* dalam pembelajaran matematika di antaranya: keyakinan terhadap kemampuan matematika, yaitu sikap positif tentang kemampuan diri pada bidang matematika; keyakinan terhadap matematika, yaitu sikap positif terhadap karakteristik mata pelajaran matematika; sikap optimis, yaitu sikap seseorang yang terwujud karena berpandangan baik dalam menghadapi segala hal tentang diri dan kemampuannya; berpikir rasional dan realistik dalam menyelesaikan masalah matematika; dan ketegasan dalam bertindak, yaitu sikap tidak ragu-ragu dalam bertindak, termasuk sikap mengambil keputusan dalam menyelesaikan masalah.

Berdasarkan observasi ditetapkan bahwa *self-confidence* sebagai masalah yang dihadapi oleh guru di kelas tersebut. Hasil observasi kelas dijumpai beberapa temuan, seperti banyak siswa yang ragu dengan jawaban dari permasalahan matematika yang diberikan, sehingga mereka berulang kali bertanya kepada guru untuk memastikan langkah penyelesaian dan solusi jawaban. Beberapa siswa lain bersikap pasif ketika mengalami kesulitan dan cenderung mengandalkan jawaban teman. Akibatnya, banyak siswa yang belum berani menyatakan pendapatnya secara mandiri di depan kelas mengenai jawaban atas soal-soal yang diberikan oleh guru. Tidak hanya itu, selama proses pembelajaran masih dijumpai siswa tidak berani untuk menanyakan sesuatu yang sulit untuk mereka pahami. Mereka lebih banyak menerima informasi daripada mencari atau menemukan pengetahuan melalui proses belajarnya.

Hal ini diperkuat dengan hasil angket data awal mengenai *self-confidence* dengan hasil nilai rata-rata 86,43 pada rentang 72,80 dan 95,20; yang berada pada kategori sedang. Secara detail, 18% dari 28 siswa memiliki *self-confidence* rendah, 68% siswa berada pada kategori sedang, dan sisanya (14%) berada pada kategori sangat rendah. Berdasarkan data tersebut menunjukkan bahwa kurangnya *self-confidence* siswa kelas VII E dalam belajar matematika.

Salah satu upaya untuk dapat meningkatkan *self-confidence* siswa adalah melalui pembelajaran aktif (Smith, Grundmann, & Li, 2018). Pembelajaran aktif ditandai dengan keterlibatan siswa yang tinggi, menempatkan kepentingan yang signifikan pada keterpusatan peserta didik (Cattaneo, 2017). Salah satu pendekatan pembelajaran aktif adalah *discovery learning* (Ott, Carpenter, Hamilton, & LaCourse, 2018). Bruner menyatakan bahwa *discovery learning* adalah suatu pendekatan yang memberikan kesempatan kepada peserta didik untuk menemukan prinsip-prinsip dasar secara mandiri (Liestya, Muchlis, & Agustinsa, 2020) sehingga mereka tidak hanya menghafal prinsip-prinsip tersebut (Westwood, 2008, p. 28). Model pembelajaran ini memberikan kesempatan pada siswa untuk belajar sendiri, mendorong siswa untuk berpikir sendiri, dan mengetahui cara membangun pengetahuan.

Berkaitan dengan hal itu, model *guided discovery learning* merupakan model *discovery learning* yang dimodifikasi. Dalam pelaksanaannya, guru memberikan beberapa petunjuk pada peserta didik saat belajar matematika. Model pembelajaran *guided discovery learning,* siswa diberikan kesempatan untuk aktif mengkonstruksi pengetahuannya sendiri dengan bantuan bimbingan dari guru. *Guided discovery learning* lebih menekankan pada proses penemuan konsep siswa melalui bimbingan guru (Muhammad & Karso, 2018, p. 109) sehingga dalam pembelajaran ini guru hanya sebagai fasilitator siswa untuk mengkonstruksi pengetahuan siswa dan mencapai hasil yang optimal.

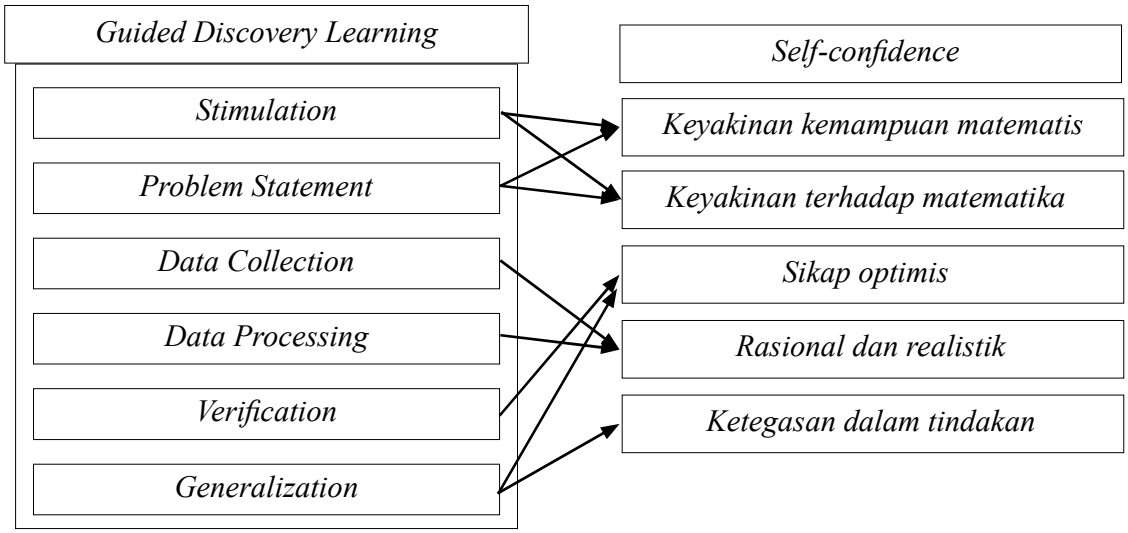
Model *guided discovery learning* mengarahkan siswa ikut aktif berpartisipasi dalam pembelajaran sehingga dapat memperkuat konsep belajar (Mahanani, Rahayu, & Fajaroh, 2019) dan membantu siswa dalam meningkatkan keterampilan pemecahan masalah matematika (Jana, Anisa, & Fahmawati, 2020). Selain itu, penelitian Hasugian (2018) memiliki hasil bahwa model *guided discovery learning* efektif ditinjau dari prestasi belajar siswa. Model ini dapat meningkatkan peningkatan rasa percaya diri siswa melalui model pembelajaran penemuan terbimbing; yaitu sebanyak 80,83% siswa memiliki rasa percaya diri dengan kategori tinggi setelah diupayakan melalui *guided discovery learning* (Kurniasih, 2016; Tran, Nguyen, Bui, & Phan, 2014).

Langkah-langkah pada *guided discovery learning* yaitu: pemberian rangsangan informasi; identifikasi masalah, pengumpulan data; pengolahan data; pemeriksaan kembali; dan pembuatan kesimpulan (Syah, 2014). Aktivitas-aktivitas siswa pada sintaks *guided discovery* menimbulkan sikap positif dan yakin dalam pemecahan masalah matematika dan pendekatan ini dapat meningkatkan *self-confidence* (Hapsari, 2011). Secara rinci keterhubungan masing-masing aspek pada *self-confidence* dan aktivitas pada langkah-langkah *guided discovery learning* disajikan pada Gambar 1.

METODE

Metode penelitian yang digunakan adalah penelitian tindakan kelas dengan model penelitian dari Kemmis dan McTaggart (Hopkins, 2008, p. 51). Model

Gambar 1. Keterkaitan antara *Guided Discovery Learning* dengan *Self-Confidence*



penelitian ini bersiklus dengan tahapan: perencanaan, tindakan, pengamatan, dan refleksi. Penelitian ini dilaksanakan terhadap 28 siswa kelas VII di SMP Negeri 2 Yogyakarta.

Rancangan utama tindakan berupa pembelajaran pendekatan *guided discovery learning* dengan langkah-langkah sebagai berikut: pemberian rangsangan informasi, pemberian masalah, pengumpulan data, pengolahan data, pemeriksaan kembali, dan pembuatan kesimpulan. Perbaikan rancangan siklus berikutnya dilakukan berdasarkan hasil refleksi.

Instrumen yang digunakan pada penelitian ini terdiri dari lembar observasi keterlaksanaan pembelajaran dan angket *self-confidence*. Lembar observasi ini digunakan sebagai alat untuk menilai keterlaksanaan pembelajaran agar sesuai dengan Rencana Pelaksanaan Pembelajaran (RPP) pendekatan *guided discovery learning* dan Lembar Kegiatan Peserta Didik (LKPD). Lembar observasi ini berisi tentang 38 butir pernyataan yang meliputi kegiatan guru (KG) dan kegiatan siswa (KS) yang terdiri dari 3 bagian, yaitu pendahuluan (apersepsi), inti pendekatan *guided discovery learning*, dan penutup.

Angket *self-confidence* dari 31 butir pernyataan dengan pengisian skala *likert* 1-5 pada setiap butir pernyataan. Butir pernyataan tersebut merupakan penjabaran dari lima aspek *self-confidence*, yaitu keyakinan terhadap kemampuan matematis, keyakinan terhadap matematika, sikap optimis, rasional dan realistik, serta ketegasan dalam tindakan. Kemudian, untuk mengetahui tingkat *self-confidence* siswa melalui pendekatan *guided discovery learning*.

Teknik analisis data menggunakan persentase dari rata-rata hasil skor kumulatif pada setiap siklus. Skor hasil pengisian angket siswa dianalisis dengan cara mengkonversikan menjadi data kualitatif dengan tabel konversi skor penilaian menurut Azwar (2012, p. 148)

dapat dilihat pada Tabel 1. Analisis hasil tes prestasi belajar pada setiap siklus tetap dilakukan agar tujuan utama pembelajaran matematika tetap dicapai. Hasil tes prestasi belajar dihitung dan ditentukan secara persentase banyaknya siswa yang tuntas melampaui batas kriteria ketuntasan minimum (KKM= 65).

Tabel 1
Kriteria Angket Self-confidence Siswa

Interval Skor Kuantitatif	Kategori
$x \geq 117{,}60$	Sangat Tinggi
$95{,}20 < x < 117{,}60$	Tinggi
$72{,}80 < x \leq 95{,}20$	Sedang
$50{,}40 < x \leq 72{,}80$	Rendah
$x \leq 50{,}40$	Sangat Rendah

Indikator keberhasilan pada penelitian ini adalah apabila memenuhi kriteria: hasil tes prestasi belajar siswa yang mencapai kriteria ketuntasan minimal (KKM= 65) paling sedikit 75%, skor rata-rata *self-confidence* siswa meningkat dengan minimal mencapai kategori tinggi, dan keterlaksanaan pembelajaran mencapai nilai minimal 80%.

HASIL PENELITIAN DAN PEMBAHASAN

Penelitian ini dilaksanakan sebanyak 2 siklus yang masing-masing siklus terdiri dari 3 kali pertemuan pembelajaran. Setiap siklus mencakup: tahap perencanaan, tahap pelaksanaan, pengamatan, dan refleksi. Siklus I dimulai pada tanggal 28 Oktober 2019 dengan durasi 6 x 40 menit dan 2 x 40 menit untuk tes pretasi belajar siklus I.

Pada tahap perencanaan siklus I, peneliti menyusun instrumen awal, yaitu RPP dan LKPD yang disusun dengan sintaks *guided discovery learning*. Selain itu, disiapkan instrumen berupa soal tes prestasi belajar, angket *self-confidence* siswa, dan lembar observasi keterlaksanaan pembelajaran. Semua instrumen terlebih dahulu dikonsultasikan dengan *expert judgment* agar valid untuk digunakan. Setelah semua instrumen sudah siap, dilanjutkan ke tahap pelaksanaan.

Tahap pelaksanaan, peneliti bertindak sebagai guru yang melaksanakan pembelajaran dengan pendekatan *discovery learning.* Rangkaian pembelajaran dilaksanakan sesuai dengan sintaks pada rancangan RPP yang dilengkapi dengan LKPD. Adapun proses pembelajaran *guided discovery learning* dilakukan dengan diskusi secara berkelompok yang masing-masing kelompok terdiri atas 4 siswa.

Pada tahap pengamatan, *observer* bertugas mengamati keterlaksanaan pembelajaran dengan pendekatan *guided discovery learning.* Tahap pelaksanaan dan pengamatan ini dilakukan secara bersamaan, guru matematika bertindak sebagai *observer* dari pelaksanaan pembelajaran. Hasil observasi keterlaksanaan pembelajaran siklus I dapat dilihat pada Tabel 2 dan Gambar 2.

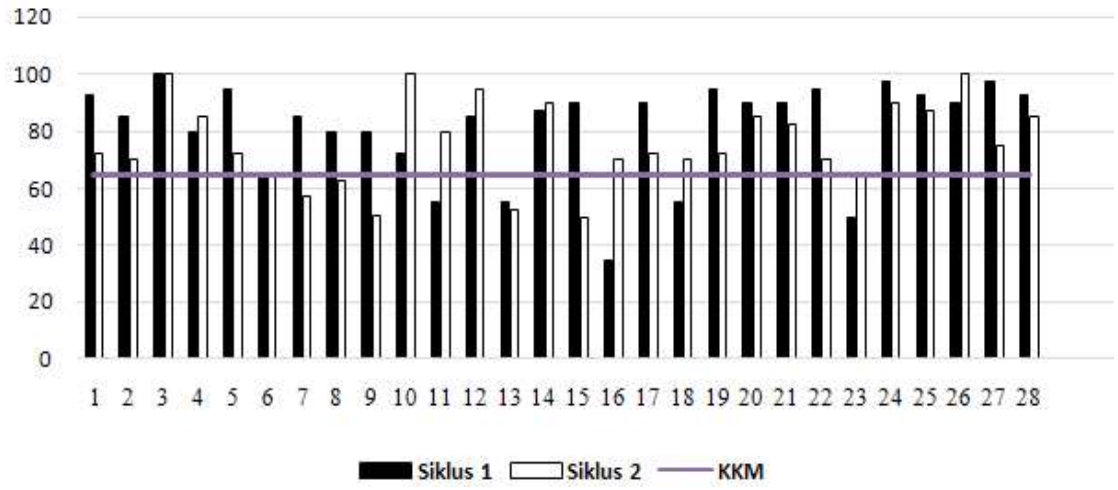
Tabel 2 menunjukkan bahwa keterlaksanaan pembelajaran pada bagian kegiatan siswa (KS) hanya mencapai 76,67% dengan target minimal 80%. Hal ini menunjukkan bahwa keterlaksanaan pembelajaran pada kegiatan siswa belum tercapai. Menurut hasil observasi, ini disebabkan oleh beberapa siswa yang belum memberikan *feedback* sesuai harapan pada tahap pembelajaran.

Pada tahap refleksi siklus I, peneliti bersama kolabolator melakukan evaluasi terhadap hasil tes prestasi belajar siswa, hasil angket *self-confidence* siswa, dan keterlaksanaan pembelajaran. Evaluasi ini mencakup di setiap langkah pada *guided discovery learning*, yaitu *stimulation, problem statement, data collection, data processing, verification,* dan *generalization.* Berdasarkan Tabel 3, hasil tes prestasi

Tabel 2
Hasil Keterlaksanaan Pembelajaran Siklus I

Aspek Penilaian	Hasil	Keterangan
Kegiatan Guru (KG)	81,33 %	Tercapai
Kegiatan Siswa (KS)	76,67%	Belum Tercapai

Gambar 2. Hasil Tes Belajar Siswa



Tabel 3
Hasil Belajar Siswa pada Siklus I dan Siklus II

	Siklus I	Siklus II
Skor Minimun	35	50.5
Skor Maksimum	100	100
Rata-rata	75,36	81,5
Ketuntasan	22 (79%)	23 (82%)

belajar siswa pada siklus I telah mencapai indikator keberhasilan yaitu 79% dari target keberhasilan minimal 75% dengan nilai rata-rata 75,36. Sama seperti hasil tes prestasi belajar, *self-confidence* siswa telah mencapai target keberhasilan minimal yaitu berada pada kategori tinggi dengan nilai rata-rata 113,93 pada siklus I (Tabel 4). Akan tetapi, pembelajaran pada kegiatan siswa (KS) belum mencapai minimal target yang ditentukan sehingga dilakukan analisis lebih lanjut pada kegiatan siswa yang belum terlaksana. Kemudian, peneliti bersama kolaborator memberikan beberapa solusi yang dapat dilakukan pada pembelajaran siklus II untuk memperoleh hasil yang optimal meskipun *self-confidence* siswa telah mencapai target keberhasilan.

Pada tahap *stimulation,* sebagian besar siswa hendaknya mempunyai keinginan

Tabel 4
Hasil Angket Self-Confidence Siswa

	Prasiklus	Siklus I	Siklus II
Rata-rata	86,43	113,93	118,36
Simpangan Baku	10,84	11,37	9,83
Kategori	Sedang	Tinggi	Tinggi

untuk menyelidiki masalah yang diberikan guru dan yakin dapat menyelesaikannya secara sederhana, baik menggunakan teknik *trial and error* maupun intuisi. Selain itu, pemberian stimulasi berupa permasalahan seharusnya dapat menimbulkan keyakinan siswa terhadap matematika, masalah matematika tersebut dapat diselesaikan. Fakta di lapangan, siswa merasa bingung dengan masalah yang disajikan sehingga siswa ragu-ragu untuk mengutarakan jawabannya. Banyak siswa tidak mampu menjawab masalah tersebut. Oleh karena itu, pada pembelajaran guru harus menjelaskan secara berulang permasalahan dengan bahasa yang mudah untuk mereka pahami.

Berdasarkan uraian di atas, peneliti yang bertindak sebagai guru bersama kolabolator melakukan evaluasi dan pemberian solusi atas masalah yang ditemukan. Solusi yang diberikan berupa pemberian masalah dengan model matematika intuitif pada pembelajaran pada siklus II. Solusi ini mampu membuat siswa mudah memahami permasalahan yang dimaksud sehingga siswa dapat memahami maksud dari permasahalan tersebut.

Pada tahap *problem statement,* ada beberapa kegiatan siswa yang belum terlaksana dengan baik. Hal ini dapat terjadi karena pada proses *stimulation* siswa tidak berhasil untuk memahami permasalahan yang diberikan. Selain itu, masih ditemukan sebagian besar siswa gagal untuk menemukan kata kunci dari suatu permasalahan. Akibatnya, siswa mengalami kesulitan untuk mengidentifikasi masalah dan merumuskan hipotesis dari permasalahan.

Untuk mengatasi hal tersebut, peneliti bersamaa kolabolator memberikan solusi perbaikan yang dapat dilakukan pada pembelajaran di siklus selanjutnya. Adapun solusi tersebut adalah pemberikan bimbingan secara klasikal di depan kelas mengenai tahapan mengidentifikasi masalah. Bimbingan ini bertujuan untuk membantu siswa dalam menemukan kata kunci dari masalah yang diberikan sehingga lebih mudah untuk dipahami.

Pada tahap *data collection* dan *data processing*, siswa mengalami kendala untuk mengumpulkan informasi dari masalah yang diberikan. Hal ini terjadi karena siswa telah mengalami kesulitan dalam memahami permasalahan. Kendala ini dijumpai saat sebagian siswa bertanya kepada guru yang sedang memantau secara berkeliling tentang cara untuk menemukan informasi dari permasalahan yang diberikan.

Berdasarkan kendala tersebut, peneliti bersama kolabolator memberikan solusi melalui pemberian *scaffolding,* yaitu bimbingan secara khusus terhadap siswa yang dilakukan guru saat pembelajaran dengan memantau setiap siswa dalam menyelesaikan masalah. Pemberian *scaffolding* ini bertujuan agar guru dapat memberikan bantuan secara khusus sesuai dengan kesulitan yang dialami siswa.

Terakhir, pada tahap *verification* dan *generalization*, melalui hasil observasi

ditemukan bahwa sebagian besar siswa belum yakin untuk menyampaikan pendapatnya mengenai jawaban yang telah diperoleh. Selain itu, siswa masih belum berani untuk menyimpulkan materi yang telah dipelajari sehingga tahap ini belum terlaksana secara optimal.

Peneliti bersama kolabolator memberikan solusi perbaikan yang dapat dilakukan untuk mengatasi kendala tersebut. Adapun solusi yang diberikan yaitu guru meyakinkan siswa terhadap langkah-langkah penyelesaian yang telah dilakukan melalui *cross-check* pada langkah-langkah penyelesaian masalah. Langkah ini diambil agar siswa tidak ragu-ragu dengan jawaban yang telah diperoleh. Selain itu, guru dapat memberikan penguatan berupa contoh dan bukan contoh agar siswa memiliki penguatan konsep yang baik dan yakin dengan jawaban yang telah diperoleh. Untuk mengoptimalkan sikap ketegasan dalam bertindak, guru melatih siswa untuk berani menyampaikan pendapat berupa kesimpulan tentang yang telah dipelajari.

Siklus II dilaksanakan pada 7 November 2019 dengan durasi 7 x 40 menit yang terbagi dalam tiga pertemuan dan 2 x 40 menit untuk tes prestasi belajar. Pada siklus II, peneliti masih bertindak sebagai guru yang melaksanakan pembelajaran dengan pendekatan *guided discovery learning*, sedangkan guru kelas bertindak sebagai *observer*.

Pada siklus II juga dilaksanakan dengan tahapan: perencanaan, pelaksanaan, pengamatan, dan refleksi. Tahap perencanaan, RPP dan LKPD disusun kembali dengan mempertimbangkan hasil refleksi pembelajaran pada siklus I. Kegiatan guru maupun kegiatan siswa yang belum terlaksana pada pembelajaran siklus I disusun kembali melalui RPP dan LKPD dengan menambahkan langkah solusi perbaikan yang diperoleh di tahap refleksi. Selain itu, peneliti bersama kolaborator menyiapkan kembali instrumen berupa soal tes prestasi belajar, *angket self-confidence* siswa serta lembar observasi keterlaksanaan pembelajaran untuk siklus II.

Tahap pelaksanaan, pembelajaran berlangsung sesuai dengan rancangan RPP dan LKPD yang telah dibuat. Pelaksanaan pembelajaran ini meliputi seluruh perbaikan pada hasil refleksi dari siklus I dilakukan agar mencapai hasil yang optimal. *Setting* kelas saat pembelajaran dilaksanakan secara berkelompok 3-4 siswa seperti pada siklus I.

Pada tahap pengamatan, guru matematika kelas VII mengamati kembali keterlaksanaan pembelajaran yang dilakukan oleh peneliti. Observasi dilakukan untuk mengetahui kembali keterlaksaan kegiatan guru (KG) dan kegiatan siswa (KS) pada pembelajaran dengan *guided discovery learning.* Adapun hasil observasi keterlaksanaan pembelajaran siklus II disajikan pada Tabel 5.

Pada tahap refleksi siklus II, peneliti bersama kolaborator melakukan evaluasi kembali terhadap hasil tes prestasi belajar siswa, keterlaksanaan pembelajaran, dan hasil angket *self-confidence* siswa.

Tabel 5
Hasil Keterlaksanaan Pembelajaran Siklus II

Kegiatan	Hasil	Keterangan
Kegiatan Guru (KG)	89,17%	Tercapai
Kegiatan Siswa (KS)	84,23%	Tercapai

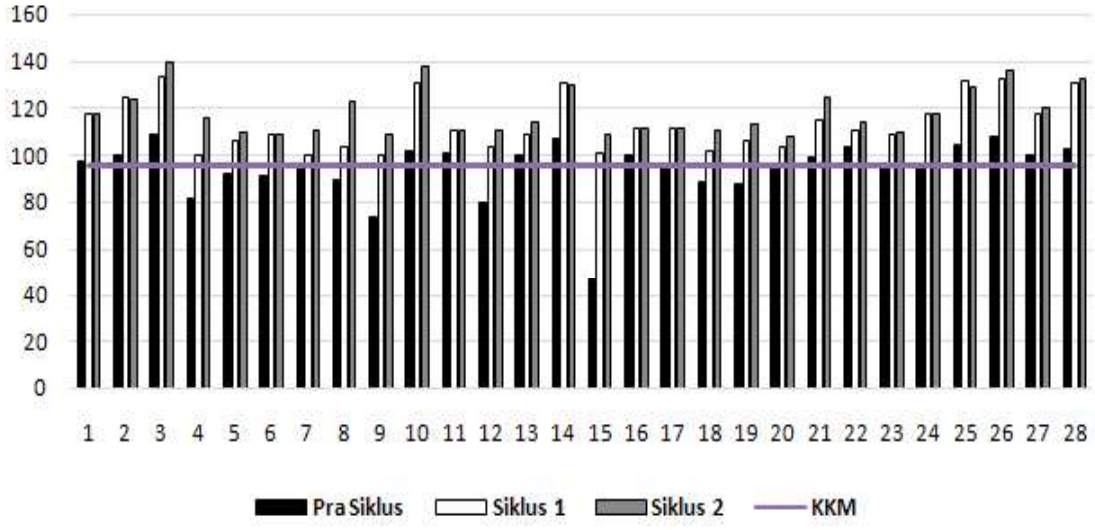
Berdasarkan Tabel 3, hasil tes prestasi belajar siswa yang terdiri dari 5 butir soal uraian memperoleh ketuntasan siswa sebanyak 82% dengan nilai rata-rata 81,5. Hasil tersebut lebih tinggi dibandingkan hasil tes prestasi belajar pada siklus I. Pelaksanaan pembelajaran memperoleh hasil 89,17 untuk kegiatan guru (KG) dan 84,23% untuk kegiatan siswa (KS). Nilai tersebut mengalami kenaikan sebesar 7,56% dari capaian kegiatan siswa (KS) pada siklus I. Berdasarkan hasil tersebut, pelaksanaan pembelajaran pada siklus II telah mencapai minimum target keberhasilan yang telah ditetapkan, yaitu 80%. Hasil angket *self-confidence* siswa pada siklus II mencapai skor rata-rata 118,36 dengan kategori tinggi dengan kenaikan 4,43% dari siklus I (Gambar 3). Dengan demikian, tes prestasi belajar, pelaksanaan pembelajaran, dan *self-confidence* siswa telah memenuhi indikator keberhasilan pada penelitian ini sehingga penelitian ini berhenti pada siklus II.

Berdasarkan uraian hasil penelitian di atas, pembelajaran dengan mengoptimalkan pendekatan *guided discovery learning* dapat diterapkan dalam pembelajaran di kelas VII E untuk meningkatkan *self-confidence* siswa.

Berdasarkan tahapan-tahapan pada *guided discovery learning,* penelitian ini dilaksanakan dengan beberapa upaya sehingga dapat meningkatkan *self-confidence* siswa. *Pertama*, tahap *stimulation,* perbaikan yang dilakukan pada tahap ini yaitu berupa pemberian masalah dengan model matematika intuitif. Siswa dihadapkan pada suatu masalah dan diharapkan memiliki keinginan untuk menyelidiki secara mandiri dan yakin dengan kemampuannya untuk menyelesaikan masalah.

Siswa diharapkan mampu memahami dengan mudah permasalahan yang dimaksud. Hasil penelitian Munir (2012, p. 252) menemukan bahwa model matematika yang disampaikan secara intuitif lebih mudah dipahami siswa secara penalaran matematis. Masalah dengan model intuitif matematis tersebut maksudnya pemberian masalah yang disusun secara bahasa

Gambar 3. Hasil Angket *Self-Confidence* Siswa



dapat dipahami oleh siswa (Istiqlal, 2019) sehingga siswa dapat merumuskan masalah penyelidikan ke dalam ungkapan-ungkapan pertanyaan yang menghubungkan dua hal atau lebih yang saling berkaitan (Rasmawan, 2018).

Upaya lain yang dilakukan pada tahap ini adalah guru meminta siswa untuk membaca permasalahan yang diberikan. Upaya ini berfungsi untuk membantu siswa mengeksplorasi bahan materi-materi terkait yang ada pada permasalahan. Suatu permasalahan membutuhkan kemampuan koneksi siswa untuk menghubungkan materi dengan masalah sehingga dapat diperoleh solusi. Guru memberikan contoh dan bukan contoh terkait masalah agar siswa paham dengan konsep materi yang disampaikan. Eggen dan Kauchack (2012, p. 177) mengatakan bahwa dalam model *guided discovery learning* perlu memberi contoh-contoh permasalahan topik secara khusus untuk memandu dan membantu siswa memahami konsep untuk memecahkan masalah.

Dengan upaya-upaya tersebut, siswa mampu memiliki keyakinan terhadap kemampuan matematis dirinya dan terhadap masalah matematika. Siswa yang percaya diri pada kemampuan matematisnya akan memberikan usaha lebih dan yakin terhadap belajar matematika sehingga memiliki pemahaman dalam menyelesaikan masalah (Fadilla, Noer, & Gunowibowo, 2017). Sikap percaya diri siswa pada matematika sebagai ilmu pengetahuan dapat diterima secara rasional dan realistik serta memberikan manfaat karena masalah kehidupan sehari-hari dapat dimodelkan berdasarkan kaidah matematika.

Kedua, tahap *problem statement* memiliki keterkaitan dengan keyakinan siswa terhadap kemampuan matematikanya untuk menyelesaikan masalah. Di tahap ini, guru memberikan bimbingan secara klasikal di depan kelas mengenai tahapan mengidentifikasi masalah. Hal ini dilakukan karena proses mengidentifkasi masalah adalah tahap awal dalam menyelesaikan masalah sehingga guru menjelaskan dengan memberikan petunjuk langkah-langkah untuk mengidentifikasi masalah (Syah, 2014, p. 245). Perbaikan ini dilakukan karena siswa memerlukan bimbingan dari guru agar siswa dapat mengikuti pada petunjuk yang guru berikan (Iltavia, 2019).

Ketiga, tahap *data collection* dan *data processing* fokus kepada siswa untuk mengumpulkan informasi sebanyak-banyaknya dari masalah tersebut dan mengolahnya secara realistik serta menafsirkan data sesuai dengan rasional mereka dalam belajar matematika. Perbaikan yang dilakukan pada tahap ini adalah pemberian *scaffolding* yang dilakukan guru secara berkeliling. Tujuannya agar guru dapat memberikan bantuan secara khusus sesuai dengan kesulitan yang dialami siswa sehingga tidak dapat diselesaikan dengan sendiri. Secara teori Vygotsky, *scaffolding* sebagai salah satu strategi dalam pembelajaran yang dapat membantu kognitif siswa, yaitu untuk menangani tugas-tugas/masalah yang menurut siswa sulit namun sebenarnya masih berada dalam jangkauan kemampuannya (*Zone of Proximal Development/ZPD*). Guru perlu menyediakan berbagai jenis dan tingkat bantuan (*helps/ cognitive scaffolding*) yang dapat memfasilitasi siswa agar mereka dapat memecahkan masalah yang dihadapi oleh masing-masing. Apriana, Maharta, dan Abdurrahman (2014) menemukan bahwa pemberian *scaffolding* memiliki pegaruh pada proses pemecahan masalah sehingga langkah ini tepat diberikan kepada siswa. Selain itu, Mahanani dkk. (2019) menyebutkan bahwa peran *scaffolding* yang diberikan guru selama

proses pembelajaran merupakan salah satu faktor yang dapat meningkatkan keefektifan model pembelajaran inkuiri. Sesuai dengan teori Vygotsky, siswa perlu belajar secara berkelompok sehingga siswa dapat saling berinteraksi dan diperlukan bantuan guru terhadap siswa dalam kegiatan pembelajaran.

Keempat, pada kegiatan *verification* siswa melakukan pemeriksaan untuk membuktikan benar atau tidaknya hipotesis yang telah ditetapkan tadi dengan temuan alternatif. Di tahap ini, siswa diberikan kesempatan untuk menemukan suatu konsep, aturan, atau pemahaman (Syah, 2014, p. 247) melalui masalah-masalah yang telah mereka selesaikan. Apabila tahap *verification* dapat dilalui dengan baik, siswa merasa yakin dan optimis bahwa yang diperoleh merupakan jawaban yang benar. Fakta di lapangan, masih terdapat siswa yang merasa gelisah mengenai jawaban yang diperolehnya. Oleh karena itu, langkah perbaikan yang dilakukan guru pada tahap ini yaitu meyakinkan siswa terhadap langkah-langkah penyelesaian yang telah dilakukan melalui *cross-check* pada langkah-langkah penyelesaian. Pada proses penyelesaian masalah, tahap ini merupakan kegiatan evaluasi yang meliputi mengecek (*checking*) yaitu pengujian terhadap hal-hal yang tidak konsisten maupun kegagalan dari suatu operasi dan mengkritisi (*critiquing*) yaitu penilaian pada operasi berdasarkan standar (Tias & Wutsqa, 2015). Langkah ini diambil peneliti yang mengacu pada langkah penyelesaian menurut Polya. Tahapan pemecahan masalah yang terpenting adalah memastikan bahwa jawaban merupakan solusi yang tepat dan benar. Berdasarkan langkah penyelesaian masalah menurut Polya, pengecekan ini mencakup *keyword* dari masalah, langkah penyelesaian masalah dan solusi dari masalah (Nurkaeti, 2018). Hal ini dimaksudkan agar siswa tidak ragu-ragu dengan jawaban yang telah diperoleh. Selain itu, guru juga memberikan penguatan berupa contoh dan bukan contoh. Penelitian Muhammad dan Karso (2018) menemukan bahwa pemberian contoh dan bukan contoh sebagai bentuk upaya untuk penguatan konsep sehingga siswa merasa yakin dengan jawaban yang diperoleh.

SIMPULAN

Berdasarkan hasil penelitian ini dapat disimpulkan bahwa *self-confidence* siswa di kelas VII E SMP Negeri 2 Yogyakarta berada pada kategori rendah sehingga diperlukan upaya peningkatan. Adapun upaya dalam meningkatkan *self-confidence* siswa dilakukan dengan metode pembelajaran *guided discovery learning* yang setiap langkahnya telah dimodifikasi. Hal ini bertujuan agar setiap langkah pada *guided discovery learning* yang memiliki keterkaitan dengan setiap aspek *self-confidence* lebih mudah untuk dilakukan upaya peningkatan. Adapun pembelajaran *guided discovery learning* yang dapat meningkatkan *self-confidence* siswa pada penelitian ini di antaranya: penyajian permasalahan matematika dengan model matematika intuitif pada langkah *stimulation* agar lebih mudah dipahami dan diprediksi hasilnya oleh siswa, pada langkah *problem statement;* guru memberikan bimbingan secara klasikal di depan kelas untuk membantu siswa mengidentifikasi masalah; guru memberikan bimbingan secara berkeliling, yaitu berupa *scaffolding* agar menemukan dan mengatasi kesulitan masing-masing siswa dalam proses mengumpulkan dan memproses data; dan guru meyakinkan siswa terhadap langkah-langkah penyelesaian melalui *cross-check/evaluation* berdasarkan kaidah penyelesaian sehingga siswa secara yakin mampu menemukan konsep

dan berani menyampaikannya yang telah dipelajarinya.

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INTERACTIVE LEARNING MULTIMEDIA: ENHANCING VOCABULARY MASTERY FOR JUNIOR HIGH SCHOOL STUDENTS

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Abstract

This study was aimed at improving junior high school students' vocabulary mastery. The subjects of this study were the students grade 7 of junior high school with a total number of 60 students. The method employed in this study was the Research and Development design. The development model used is the ADDIE modification development model. The steps in the ADDIE development consist of five stages; namely analyzing, design, development, implementation, and evaluation. Product trials are carried out in three stages, namely small group trials, operational trials, and large group trials. The instruments used in development research were observation sheets, interviews, and assessment questionnaires. A *t*-test was used to analyze the effectiveness of media development. The media then were validated by the media experts, material experts, and teachers. The results shows that the media is feasible with an average score of 4.55. The findings also show that the Interactive Learning Multimedia effectively enhance students' vocabulary mastery for junior high school students and able to be used as a catalyst or alternative media teaching vocabulary.
Keywords: *interactive learning multimedia, English learning, vocabulary*

INTRODUCTION

The importance of English in the Indonesian education context can be seen as one of the subjects in the national exam. The Regulation of the Minister of National Education of the Republic of Indonesia Number 46 of 2010 Chapter IV point 9, with the inclusion of English in the National Examination, expects that students' abilities in learning English will increase. National education hopes that students will be able to continue to improve their English skills in terms of writing, pronunciation, and usage. However, in the process of learning in the classroom, students still face difficulties in learning English vocabulary. Their mastery of English vocabulary is still low. This is derived from many factors, both from internal and external factors such as learning motivation, student intelligence, learning styles, environmental factors, and learning media. As explained by Papilaya and Huliselan (2016), students have different learning styles which can influence students' understanding of learning.

Vocabulary has an important role in learning English. Yet, in the process of learning English in Indonesia at the junior high school level, there are no specific subjects that teach students to master English vocabulary. This is also stated by Nunan (1991) who explains that vocabulary is the basis for people to speak so that the information provided is in accordance with the aims and objectives. If students do not know the meaning of the vocabulary that they read or listen to in the learning process, there will be problems of misunderstanding pertinent to vocabulary. Added to this, Khan (2011) explains that the technological revolution and English e-learning system have emerged as one of

the most widely used in the world as an important formal communication tool in the current era, the cyber and digital era. Therefore, students must also master the English vocabulary since it will help them in learning and mingling with other people in this cyber era. Learning vocabulary is viewed as an input-driven process in which it measures to emerge from user experience with the language (Harrington, 2018), that in learning English vocabulary is a learning process where students will have learning experiences in a particular language specifically English language.

The difficulties that are often encountered by students when learning English are to master the English vocabulary, this is in accordance with the results of the interviews conducted by the researchers on 7th grade students of *SMP N* 2 Turi and the English teachers. While the result of observations on students when learning English in class 7 at *SMP* N 2 Turi is obtained through the information that students have difficulty in mastering English vocabulary. They do not know the meaning of English words. Another reason that makes them difficult in learning English is that English is not a native language for them. Another factor that makes 7th grade students of *SMP* N 2 Turi find it difficult to master English vocabulary at school is the lack of supporting learning media. Teachers only use media-books and worksheets in the learning process without using other supporting media. Media is not the main tool in the learning process in the classroom. Learning media can help students more easily remember and memorize the learning materials, especially memorizing English vocabulary.

According to Ahmad's opinion (2010) in the process of teaching English vocabulary, teachers should often repeat words with a drill and practice system, teachers can use interesting media so that students can learn vocabulary with focus. However, this is rarely found in schools, especially in *SMP* N 2 Turi where English teachers only use the media-books and worksheets without the support of other media that are more interesting and make students more focus on learning. And the methods used are still using conventional and lecturing methods. Meanwhile, according to Sanaky (2013) learning media is an educational tool that can be used as an intermediary in the learning process to enhance effectiveness and efficiency in achieving teaching objectives. This leads to how learning objectives can be achieved. In the same vein, Rusman, Kurniawan, and Riyana (2012) also explain that learning media is a tool that allows students to understand and comprehend something easily and remember it for a long time compared to the delivery of material by face to face and lectures without assistive devices. The application of vocabulary teaching with appropriate learning media is effective to foster student learning interest because students are allowed to feel the nuances of learning and new experiences that are more enjoyable.

Based on several obstacles faced by students in mastering English vocabulary, researchers focus on the use of interesting alternative learning media that can help students learn English easily. This will influence the learning process with lecture methods that often make students get bored and unfocused. Interesting learning media and in accordance with the learning needs of 7th grade students of *SMP N* 2 Turi in improving English vocabulary mastery is interactive learning multimedia (MPI). Development of MPI by researchers is aimed at improving the vocabulary mastery of 7th grade students of *SMP N* 2 Turi by interestingly presenting material

and making students more focused on learning.

Munir (2013) argues that interactive learning multimedia is a combination of various media (file format), a combination of various kinds of media (file types) in the form of texts, vector or bitmap images, then graphics, sound or sound, video animations, interactions, and other types that are packaged into one digital data (computerized) and then used to convey or deliver information in the form of messages to the general public. Meanwhile Surjono (2017) explains that interactive learning multimedia is a combination of text, images, graphics, sound, and video, and animation, simulation in an integrated and synergistic manner with the help of certain computer applications to achieve learning objectives. This is in line with Saputra and Purnama (2012) that this multimedia application is expected to facilitate understanding of learning materials. Furthermore, Daryanto (2013) explains that interactive learning multimedia is multimedia that is equipped with a controller that can be operated by the user, so the user can choose what he wants for the next process. Examples of MPI are interactive learning, game applications, and others.

In teaching vocabulary in a classroom, it is quite difficult because English is not the first language used by the students. However, McCarthy and O'Dell (2017) provide ways to teach vocabulary to students. The first thing is that students are given an English text with a few words in bold so that students make the words look more interesting. Then the second is to give meaning to all vocabulary in bold given an explanation of the meaning in the forms of English or Indonesian. Next, the students can be given training by using sentences and ask them to fill in the sentences with the appropriate words. Through MPI the researchers hope to be able to improve their mastery of English vocabulary and make students interested and motivated in learning (Nopriyanti & Sudira, 2015). From the results of the trial, it was stated that interactive learning multimedia on the basic competencies of installing lighting systems and electrical wiring of subject matter for external lighting systems could improve student learning outcomes. Hence, interactive learning multimedia need to be used to improve students' learning outcomes.

METHOD

This study is in the model of Research and Development (R&D) which is aimed at developing and validate the products produced. The product developed is in the form of interactive learning multimedia in mastering English vocabulary in grade 7 *SMP N* 2 Turi. The development model used is the ADDIE modification development model. The steps in the ADDIE development consist of five stages; namely analyzing, design, development, implementation, and evaluation. Product trials are carried out in three stages, namely small group trials, operational trials, and large group trials.

The instruments used in development research were observation sheets, interviews, and assessment questionnaires. The resulted product quality data comes from the assessment of media experts, material experts, and teachers and then changes the average score of each qualitative indicator into a qualitative value according to the assessment criteria as well as the translation of each aspect of the criteria into a qualitative value (Widyoko, 2009).

A *t*-test was used to analyze the effectiveness of media development. The *t*-test calculations in this study used SPSS software version 16.0 for windows. If the

Table 1
Interval Convertion of Qualitative and Quantitative Data

Quantitative Data	Score Interval	Qualitative Data
5	X > Xi + 1.80 Sbi	Very Good
4	Xi + 0.60 Sbi < X < Xi + 1.80 Sbi	Good
3	Xi – 0.60 Sbi < X < Xi + 0.60 Sbi	Enough
2	Xi – 1.80 Sbi < X < Xi – 0.60 Sbi	Low
1	X < Xi – 1.80 Sbi	Very Low

t-test in the calculation is obtained Sig value <0.05, it can be seen that there are differences in student test results. If the Sig value> 0.05 then there are no differences in student test results in the two classes.

RESULTS AND DISCUSSION

In this study, several stages are carried out; namely the analysis, design, development, implementation, and evaluation stages. It was conducted at SMP N 2 Turi. The subject in this study was grade 7 of SMP N 2 Turi. After researchers obtained information and problems faced by students, it is necessary to use alternative learning media that can help students learn English easily based on students' needs. One of the media that suits students' needs and interesting learning media is interactive learning multimedia (MPI). The following is an explanation of the results and discussion in the research development of interactive learning multimedia to improve vocabulary mastery in learning English.

The product produced from this research and development is in the form of MPI. The following are the stages of the results of the development of interactive learning multimedia products.

The *first* stage is analysis to obtain information, constraints faced by students and provide appropriate solutions. The *second* stage is the design or planning stage that all activities starting from the media planning, the material will be delivered, and the evaluation will be given to students. In the *third* stage, the development and production stages of MPI are carried out. In the production and development stage, it involves experts, both instrument validators, material experts, media experts with a minimum qualification of two lecturers. After the development of the MPI is completed, then an assessment is made by experts. Table 2 shows the results are obtained from media experts.

In the product due diligence of the media experts, it is obtained 4.55 results that can be categorized as very good. After obtaining an assessment from a media expert then it was proceeded via the material feasibility test conducted by the material expert. The presentation of the results of the assessment from the material experts on the development of MPI as shown in Table 3.

The results of the assessment of the feasibility of interactive learning multimedia in English learning in grade 7 of SMP N 2 Turi by material experts, it has very good scores with a an average score of 4.55.

Interactive learning multimedia assessment by the 7th grade English teacher of SMP N 2 Turi as well as the results of the feasibility assessment of the interactive multimedia of the 7th grade elementary

Table 2
The Result of Interactive Learning Multimedia by Media Experts

No	Aspect	Score	Mark	Category
1	Media Appearance	4.5	"SB"	Very Good
2	Image and Animation	4	"B"	Good
3	Texts	5	"SB"	Very Good
4	Audio dan Video	4.7	"SB"	Very Good
	Average Scores	4.55		Very Good

Table 3
The Result of Interactive Learning Multimedia by Material Experts

No	Aspect	Score	Mark	Category
1	Material Eligibility	4.1	"B"	Good
2	Material Accuracy	4.6	"SB"	Very Good
3	Language	5	"SB"	Very Good
4	Material Novelty	5	"SB"	Very Good
	Average Score	4.55		Very Good

school by the English teacher of SMP N 2 Turi is as shown in Table 4. The results of the feasibility assessment of interactive learning multimedia grade 7 SMP N 2 Turi by English teachers of SMP N 2 Turi, it has very good results of 4.55.

A trial was conducted to obtain responses and effectiveness of interactive learning multimedia when used in learning in 7th grade junior high school. The trial was conducted on 7th grade students of SMP N 2 Turi. Student responses were obtained through student questionnaire responses from the aspect of media, content/material aspects, which were then converted to Likert scale values. The procedure of conducting

Table 4
The Result of Interactive Learning Multimedia by Teachers

No	Indicators	Score	Mark	Category
1	Media Appearance	4	"B"	Good
2	Image and Animation	4	"B"	Good
3	Texts	4	"B"	Good
4	Audio dan Video	4	"B"	Good
5	Material Eligibility	4.1	"B"	Good
6	Material Accuracy	4.2	"SB"	Very Good
7	Language	4.4	"SB"	Very Good
8	Material Novelty	4.5	"SB"	Very Good
	Average Score	4.55		Very Good

the trial is carried out in three stages; namely small trial groups, operational trial groups, and large trial groups. The results of interactive learning multimedia trials in the English learning process in 7th grade junior high school as shown in Table 5.

The results of small group trials are still relatively low with an average of 2.9 with a sufficient criteria. The next step is the operational test, students fill in the response questionnaire that contains statements about interactive learning multimedia. Student response data includes aspects of MPI media, aspects of content/material. Data on the results of student responses obtained in operational tests are then converted according to Table 6.

Based on these data, it can be concluded that the students' responses to interactive learning multimedia in the aspect of media, content/material included in the category of "Very Good" with a value of 4.38. Large group trials are slightly different from small group trials and operational tests because they use the experimental method. Besides, it is also a stage of implementing a product on the research subject. The experimental method involves two large classes, namely the experimental class, and the control class. The experimental class is a class that uses interactive learning multimedia in English learning while the control class is a class that uses the 7th grade student's book of SMP 2013 Curriculum. The results of the student responses to the large group trials as shown in Table 7.

Based on the data obtained by students' responses to multimedia interactive learning in the aspect of media, the content/material is included in the excellent category with a score of 4.53. Then the test or evaluation stage is carried out to determine the achievement of the cognitive aspects that emphasize students' knowledge ability to master vocabulary in English that students have. There are two classes

Table 5
The Result of Students' Response in Small Group

No	Indicators	Average	Criteria
1	Interactive Learning Multimedia makes it easier for me to understand the material.	3.3	Enough
2	Interactive Learning Multimedia makes it easier for me to understand English vocabulary.	3.6	Good
3	The letters used to make it easy for me to read MPI.	2.6	Enough
4	The proportion of images on the media is appropriate.	2.6	Enough
5	Sound and music quality on the media is good.	3	Enough
6	Use of examples in accordance with daily life.	3	Enough
7	The material in MPI is interesting.	3	Enough
8	The sentences used in MPI are clear and easy to understand.	3	Enough
9	The language used in MPI is simple and easy to understand.	2.3	Low
10	The letters used are simple and easy to read.	3	Enough
	Total	29.6	
	Average	2.9	Enough

Table 6
The Result of Students' Response in Operational Test

No	Indicators	Average	Criteria
1	Interactive Learning Multimedia makes it easier for me to understand the material.	3.7	Good
2	Interactive Learning Multimedia makes it easier for me to understand English vocabulary.	4.2	Good
3	The letters used to make it easy for me to read MPI.	4.5	Very Good
4	The proportion of images on the media is appropriate.	4.5	Very Good
5	Sound and music quality on the media is good.	4.8	Very Good
6	Use of examples in accordance with daily life.	4.5	Very Good
7	The material in MPI is interesting.	4.6	Very Good
8	The sentences used in MPI are clear and easy to understand.	4.2	Very Good
9	The language used in MPI is simple and easy to understand.	4.4	Very Good
10	The letters used are simple and easy to read.	4	Good
	Total	43.8	
	Average	4.38	Very Good

Table 7
The Result of Students' Response in Big Group

No	Indicators	Average	Criteria
1	Interactive Learning Multimedia makes it easier for me to understand the material.	4.7	Good
2	Interactive Learning Multimedia makes it easier for me to understand English vocabulary.	4.4	Good
3	The letters used to make it easy for me to read MPI.	4.5	Very Good
4	The proportion of images on the media is appropriate.	4.6	Very Good
5	Sound and music quality on the media is good.	4.3	Very Good
6	Use of examples in accordance with daily life.	4.8	Very Good
7	The material in MPI is interesting.	4.5	Very Good
8	The sentences used in MPI are clear and easy to understand.	4.5	Good
9	The language used in MPI is simple and easy to understand.	4.3	Very Good
10	The letters used are simple and easy to read.	4.7	Good
	Total	4.53	
	Average	4.53	Very Good

used, namely the experimental class, class 7B which uses interactive learning multimedia and 7C class, control class that uses 2013 Curriculum student books. Each experimental and control class has 32 students each. The pretest and posttest data results in the experimental class and the control class were analyzed by using a *t*-test (independent samples *t*-test) with the help of SPSS software version 16.0 for windows. After that, the prerequisite test analysis for the pretest and posttest data in the experimental class and the control class were explored. Table 8 presents the results of the pretest and posttest normality test.

After the analysis of prerequisite tests for pretest and posttest data, it is found the experimental and control classes have normal and homogeneous data. The next is the *t*-test analysis using SPSS software version 16.0 for windows. Data requirements are significant if the significance (*p*) is less than 0.05. Table 9 shows the pretest and posttest homogeneity test results.

Then, calculation is conducted on the effect of using MPI in the experimental class and the use of the 2013 Curriculum book media using a *t*-test. The results of the *t*-test analysis showed that there were significant differences between the experimental class using interactive learning multimedia in English learning compared with the control class using 2013 Curriculum student books at SMP N 2 Turi. This is indicated by the obtained t_{count} of 6.009 with df of 62 and t_{table} of 1.530 at a significant level of 0.000 then the t_{count} is greater than t_{table} (th: 6.009> tt: 1.530) or the significance of 0.000 below the p_{value} <0.05. Table 10 presents the result of the *t*-test.

The experimental class that used interactive learning multimedia gained an average posttest score of 79.06. Meanwhile, the control class that used the 2013 Curriculum students' books in English obtained an average posttest score of 68.75.

The analysis phase was carried out by the researchers to find out the students'

Table 8
The Result of Normality Test of Pretest and Posttest of Experimental and Control Class

	Class	Shapiro-Wilk		
		Statistic	df	Sig.
Pre-test	Control Class	.923	32	.024
	Experimental Class	.899	32	.006
Post-test	Control Class	.949	32	.137
	Experimental Class	.943	32	.090

Table 9
The Result of Homogeneity Test of Pretest and Posttest of Experimental and Control Class

	Levene Statistic	df1	df2	Sig.
Pre-test	.076	1	62	.784
Post-test	.865	1	62	.356

Table 10
The Result of t-Test of Experimental and Control Class

Resource	df	Significance (p)	Description
Posttest	62	0.000	Significance (p=0.000<0.05)

needs in learning and the problems faced by students in learning, then the researcher determined the solution to resolve the problem. Finally, it was decided that developing MPI was the right solution to help students learn easily and pleasantly. The analysis phase was completed after that it was continued with the design phase to develop MPI as an alternative learning media that supports the learning process. At the design stage of the activity were formulating learning objectives: determining learning material, strategies, and evaluations. So in this stage, it required effective steps in designing learning programs. The first step taken was to make a draft of the implementation of learning (RPP) in accordance with *KI* and *KD*, then arranging the material in accordance with the RPP and design multimedia interactive learning.

At the multimedia design stage, this interactive learning was carried out with different stages according to the needs of students that had been previously designed. These activities included making flowcharts then making storyboards. The final stage in designing was determining the form of assessment used to determine the effectiveness of learning multimedia products, namely cognitive assessment in the form of multiple-choice questions.

After the design phase was complete then it was continued with the development stage. At this stage, the experts involved in evaluating the media that had been developed, both media experts, material experts, teachers, and student responses. On the results of the assessment of media, experts obtained a pretty good result that is 4.55 which is categorized very well for the media used in the learning process. Based on the explanation from Table 2, it can be seen in several aspects to get the points above 4. It states that MPI is suitable for use in the process of learning English in class 7 of *SMP N* 2 Turi. This is supported by Nugroho, Putra, Putra, and Syazali (2017) who obtained results based on the media aspect is a value of 4.7 from validator 1 and obtained a value of 4.6 from validator 2 so that the average results obtained from media experts reached 4.65. This means that the media on the criteria is at the very good cateagory.

The results of the expert material assessment produced the final score for the aspect of material worth with a score of 4. With a good category, the aspect of material accuracy with a score of 4.6 with a very good category, languages with a score of 5 with a good category, as well as material expertise with a score of 5 with a very good category. It can be seen that the material expert gives a good score in terms of the material available in MPI to be applied in the learning process. This is in accordance with Januarisman and Ghufron (2016) by obtaining data processing results from the validation of two material experts which has "good" and "very good" criteria with an average rating 3.73 and 4.23. An interactive multimedia learning assessment by a grade 7 English teacher in *SMP N* 2 gains an MPI product evaluator with the results of "SB" categorized as "Very Good" referring to Table 4. The assessment given by an English teacher in *SMP N* 2 Turi obtains

very good results both in developing MPI aspects of the material contained as well as the media as a whole. On the results of the assessment of English teachers on interactive learning multimedia for media display aspects, it obtained an average of 4 results including the value of "B" with the category "Good".

Then the English teacher in interactive learning multimedia for the aspects of images and animations obtained an average of 4 including "B" grades in the "Good" category. The assessment of interactive learning multimedia for the text aspect obtained an average of 4 including the "SB" score with the "Very Good" category. Furthermore, the assessment of interactive learning multimedia for audio and video aspects gave an average of 4 including the "SB" score in the "Very Good" category. The English teacher also gave 4.1 grades "B" with the category "Good for the aspects of Material Feasibility. In the aspect of material accuracy, the results obtained an average of 4.2, including the value of "SB" with the category "Very Good". Then the assessment on the language aspect obtained an average score of 4.4 including the "SB" score in the "Very Good" category. Data on the results of junior high school teacher evaluations on interactive learning multimedia for material skill aspects obtained an average of 4.5 including the "SB" score with the "Very Good" category. It can be concluded that the English teacher gives grades in the excellent category and is suitable for use in the learning process as another alternative media. The feasibility of the media developed by the researchers is in line with the results of Rasyid, Aziz, and Saleh (2016) which obtained the average value of eligibility from the validator for the feasibility of the media of 3.5 and the average value of eligibility for the material of 3.6 which means that this multimedia-based learning media in terms of media and material included is in the "decent" category.

To find out the effectiveness of MPI development was done by knowing the students' responses and testing. This is in accordance with Herawati and Muhtadi (2018) who said that the tests in the form of pretest and posttest questions were used to determine the effectiveness of interactive e-module products in improving student learning outcomes. In Table 5, the students' response data in the small group trials yielded relatively low results with an average of 2.9 included in the sufficient category. This happens because the small trial groups are the first time that students use interactive learning multimedia, students have never used MPI before. Students have not adapted to MPI developed by researchers so students are still awkward in operating it. At the time of data collection at the trial stage, small groups are classified as low due to many influential factors such as unfamiliarity with the use of media. It was also supported by research by Setiyorini, Patonah, and Murniati (2016) which obtained the results of limited trials to respondents with a total of 36 feasibility learning media in the form of Moodle on temperature and heat material was 85.27% (very feasible category).

After the data is obtained at the small group trial stage and carried out revisions in accordance with the criticisms and suggestions obtained, then the second trial is carried out namely operational trials. In the operational test phase, the data obtained is quite good compared to the trials in the small groups listed in Table 6. Obtained data on responses to multimedia interactive learning in the media aspect, the contents are included in the "Very Good" category with a value of 4.38. From the student response data on operational tests, there are criticisms and suggestions from students,

namely the color is too dark, the letters are difficult to read because the size is not large enough, and the color contrast. So, interactive learning multimedia in English 7th grade Junior High School learning is revised and refined based on criticism and suggestions from students. Large group trials are slightly different from small group trials and operational tests because they use the experimental method. Additionally, at this stage is the implementation stage, where the use of MPI in the learning process is carried out. The experimental method involves two large classes, namely the experimental class and the control class. The experimental class is a class that used interactive learning multimedia in English learning while the control class is a class that used the 7th grade student's book 2013 Curriculum 2013.

Subjects of students taken are not students who have been tested in small and operational groups. Therefore, a large trial group was conducted on 32 students from class 7B as an experimental class and 32 students from class 7C as a control class which was used as an experimental and control class assisted by an English teacher in accordance with student abilities and student learning outcomes. Student response data in the large trial groups are only given to the experimental class students who use interactive learning multimedia to find out information about the media that has been developed by the researchers. Filling the data of the students' response is given after the students use interactive learning multimedia. After the student response, the result of data is obtained in a large group trial and then it is converted. In accordance with the data in Table 7 regarding student responses in large group trials, an average grade of 4.53 was obtained with a very good category. This is in agreement with the research of Khotimah and Santosa (2016) who obtained the analysis results obtained by assessing each aspect, namely the design aspect was stated very good with a percentage of 86%, the material aspect was stated very goodl with a percentage of 87%, and the benefit aspect was stated to be very good with a percentage of 89%.

At the evaluation stage, tests were conducted in the form of a pretest before using MPI and posttest after using MPI. After obtaining each of the pretest and posttest scores, a normality test was then performed. The pretest and posttest normality tests were carried out in the experimental class and the control class using SPSS software version 16.0 for windows that can be seen in Table 8. Data can be said to be normally distributed if the significance is above 0.05. Provision of tests in the form of a pretest to find out students 'prior understanding before being given treatment and posttest to find out students' understanding after being given treatment. Then the homogeneity test of the pretest and posttest results was carried out in the experimental class and the control class which was then analyzed using SPSS software version 16.0 for windows in Table 9. The pretest and posttest results can be said to be homogeneous in distribution if the significance is above 0.05

After the analysis of prerequisite tests for the pretest and posttest data, the experimental and control classes have normal and homogeneous data. Next is the *t*-test analysis using SPSS software version 16.0 for windows. Data requirements are significant if the significance (p) is less than 0.05. The *t*-test results obtained significant 0.000 or 0.000 significance below the p_{value}<0.05. The experimental class that uses interactive learning multimedia obtains an average score of 79.06 while the control class that uses students' books

Curriculum 2013 in English gets an average score of 68.75. Thus, interactive learning multimedia effectively increases vocabulary mastery in learning English in 7th grade junior high school 2 Turi. The results are in accordance with the results of research from Heriyanto, Haryani, and Sedyawati (2014) on the use of MPI tests based on education games effectively applied to the learning of colloidal system chemistry in class XI SMA 1 Subah with the completeness of 94.44% (KKM 75), very good interest at 83.33% and very high activity at 86.11%.

CONCLUSION

Interactive learning multimedia has been produced to improve the mastery of vocabulary in learning English of 7th grade SMP 2 Turi with ADDIE models with five stages. *First*, *analyze*. Including the stage of identifying instructional needs, analysis of general instructional goals, and identification of students' initial characteristics. *Second*, *design*. Including the stages of designing special instructional, designing multimedia interactive learning frameworks, and developing quality and effectiveness assessment instruments. *Third*, *development*. Including the preparation of interactive learning multimedia, development, and revision. *Fourth*, *implementation*, carried out in small group trials, operational trials, and large group trials. *Fifth*, *evaluation*. Multimedia interactive learning English is appropriate to be used to improve the mastery of vocabulary in learning English in grade 7 Middle School 2 Turi. Based on the results of the due diligence test by media experts, material experts, and Junior High School English teachers, all aspects obtained a very good category.

Multimedia interactive English learning proved effective for increasing vocabulary mastery in learning English in grade 7 Middle School 2 Turi. The effectiveness of interactive learning multimedia is obtained from small group tests, operational tests, and large group trials based on student response data and tests. The experimental class that used interactive learning multimedia gets an average posttest score of 79.06 while the control class that used the 2013 Curriculum students' books in English gets an average posttest score of 68.75. In short, interactive learning multimedia effectively increases vocabulary mastery in learning English in grade 7 Middle School 2 Turi. In addition, researchers also hope that MPI can be used when learning English 7th grade junior high school because it improves learning outcomes and students' vocabulary mastery and is used, as a variation of the learning media of 7th grade junior high school students.

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CHINESE LANGUAGE LEARNING IN ASIA AND THE ETHNIC IDENTITY OF THE CHINESE POSTERITY

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Abstract

This paper firstly overviews the historical changes of Chinese language and its education in four nations of Southeast Asia. These nations experienced the blank period when Chinese language was oppressed or forbidden to use by the ruler at the time, although length and austerity of the blank period differs from nation to nation. However, according as their relationship with People's Republic of China in the international political arena has improved and economic exchanges have been vitalized, a different scene from previous era can be observed in the attitude towards overseas Chinese and their language. Questionnaire surveys were carried out for several years to make clear how the situation of Chinese language education looks like. Statistical analysis of the responses by nation and the comparison of responses from Chinese and non-Chinese youngsters leads us to some findings of how different conditions of each country give influence to the way Chinese language education is carried out and the consciousness and ethnic identity through language is being formed.
Keywords: *chinese language, language learning, ethnic identitiy, Chinese posterity*

INTRODUCTION

English is the principal language of international communication and will continue to maintain that position; however, major world powers are asserting the status of their own native languages and are striving to maintain and disseminate them in the globalizing world. Use of the Chinese language has also been conspicuously increased recently, as if to challenge the hegemony or overconcentration of English. As for the number of Internet users by language in the world, the Chinese language accounted for 21.5%, which ranked second to the 26.0% of English, as of mid-2015. Internet users who communicate in Chinese increased 2,080.9% from 2000 to 2015 (Internet World Stats, 2019, p.1). There is also statistical evidence that the Chinese language has already exceeded English in terms of the distribution of principal languages in the world population (Huntington, 2000, p. 95). Thus, the significance of the Chinese language as an international language is not small.

A proverb says, "There are ethnic Chinese wherever there is sea water, and Chinese language education is indispensable wherever there are ethnic Chinese (Weineng & Xiaohong, 2003). Southeast Asia is a place where overseas Chinese (華僑) and ethnic Chinese (華人) lived the earliest and most populously, and the education of Chinese as their ethnic language has continued in spite of it being full of twists and turns. In addition, the Chinese government has been positively driving forward the international spread of their own language and its external education policy as represented by the worldwide deployment of the Confucius Institutes. Many topics deserving pedagogical analysis and scrutiny are contained in many of the phenomena and undertakings of China's

language dissemination policy, for example, how teachers in charge are prepared and trained, how the cost of teaching materials and other necessary expenses are covered, and what cultural influence and ideological elements are contained within the teaching materials.

To examine the many topics concerned with overseas Chinese and ethnic Chinese, there are special research institutions such as the Overseas Chinese Research Center of Takushoku University in Japan. Research institutes at Jinan University, Huaqiao University in southern China, and Jinan International University in Taiwan specializing in the issues of overseas Chinese and ethnic Chinese have been actively accumulating research results including a plethora of historical studies.

Among these studies, issues of Chinese language education in various places are also included. However, there are only a few fieldwork-based studies that have clarified the situation from the viewpoint of the consciousness of children who learn the Chinese language. In particular, there are almost none that compare and contrast the situation from the viewpoint of Chinese posterity in genealogy (華裔) and non-Chinese posterity with regard to country of residence within several Asian nations, over the forty years that I have surveyed the subject. Therefore, this paper, depending on previous studies from the above-mentioned specialized research institutions and others, first roughly discusses changes in the Chinese language and its education in four nations in Southeast Asia, i.e., Cambodia, Thailand, Indonesia and Vietnam, from a viewpoint of identity formation of the ethnic Chinese people through their own language, and the Chinese government's policy on external language education toward outside countries. Then, some knowledge acquired from a series of questionnaire surveys of students concerning Chinese language education which have been carried out over the past five years in each country will be presented.

Although the start of movement of people between Cambodia and China dates back to as early as the Tang dynasty, Chinese who immigrated to Cambodia increased during the period of governance by France, which began in 1863 and a Chinese society within Cambodia was gradually (Yu-e, 1995, p. 373) formed. The colonial government took the "Bang Office" (幇公所), or consolidated benevolent association system, as a policy for overseas Chinese. A "*bang* (幇)" is a benevolent organization in which those from the same province and of the same family origin or those engaged in the same trade organize themselves and cooperate with each other. It is an expanded form of a guild. These *bangs* impose a duty of subscription to any guild or clique. This cooperation is primarily related to economic activities, and, even in foreign lands, this system is maintained. As a result, halls for *bangs* associated with Chaozhou (潮州), Guangdong (広肇), Fujian (福建), Hainan (海南), and Hakka (客属) were established. In 1914 the Chaozhou Bang founded its Duanhua (端華) School in Phnom Penh, other *bangs* followed and built their own schools as if to assert their identity. Schools associated with five *bangs* existed in the early 1930s: the Minsheng School of Fujian Bang, the Guangjihui School of Guangdong Bang, the Jicheng School of Hainan Bang, and the Chongzheng School of Hakka Bang.

Since the 1950s, many overseas Chinese acquired Cambodian nationality, and became the ethnic Chinese of Cambodia. Many Chinese schools were developed from the 1950s to the 1960s with more than 200 schools existing in the country and over 50,000 children enrolled in elementary

and junior high schools at that time. Fifty schools existed in Phnom Penh. Among them the Duanhua School was the largest with as many as 4,500 students enrolled. Although many schools were elementary school level and junior high school level, education of the high school level was also provided in both the Duanhua School and the Minsheng School in Phnom Penh, at the Guoguang School in Battam Bang, and also at the Zhongshan School in Kratie (Yu-e, 1995, p. 374).

However, the administration of President Lon Nol oppressed overseas Chinese and ethnic Chinese in 1970. Use of the Chinese language and its education was totally prohibited, and Chinese language schools were forced to close. Overseas Chinese were again the target of a 'cleanup' or persecution campaign during the era of the ultra-left Khmer Rouge government from 1975 to 1979. The population of overseas Chinese and also of the ethnic Chinese decreased until the beginning of the 1980's due to their evacuation from the country during the Vietnamese inroads.

However, with the arrival of a relatively peaceful time, overseas Chinese and ethnic Chinese experienced a phoenix like revival with the population consistently increasing. In 2015, the population of overseas Chinese and ethnic Chinese was 223,300 and accounted for 1.4% of the total population 15,864,000 (Joshua Project, n.d). Meanwhile, since the end of 1990s, Chinese language education has been recovering. In October, 1991, the Qihua (啓華) School in Kompong Cham Province resumed lessons. These came about, in part, through the efforts of Mr. Chen Shu (陳薯), who developed school infrastructure.

It became impossible to satisfy people's needs with small-scale private supplementary classes; therefore, the Zhongyang (中央) School, the Polongbian (坡隆辺) School, the Lipo (立坡) School, the Shalina (莎麗娜) School, the Huaqun (華群) School, and the Peiwen (培文) School opened successively in Phnom Penh from 1991 to 1992. Outside of Phnom Penh, the Lianhua (聯華) School in Battambang Province, the Juequn (覚群) School in Kam-pot Province, and the Zhongshan (中山) School in Kratie Province. also resumed classes. The Chinese government has been promoting positive support of Chinese language education through the Association of Khmer Chinese in the Kingdom of Cambodia (柬華理事総会), which is a benevolent organization among overseas Chinese and ethnic Chinese in Cambodia. However, it cannot be said that Chinese language education was necessarily sailing large before the wind. This is due to the influence of the Asian economic crisis that happened subsequently. Each Chinese Language school is making its own efforts in carrying out the bilingual education of Chinese and Khmer or trilingual education with the inclusion of English.

It is said that approximately 7 million ethnic Chinese, who account for a little more than 10% of the total population, were in Thailand as of 2007. According to another statistic, it is also said that the number is less than 1.6 million. Because the Thai government does not openly provide demographic statistics by ethnic group, estimated values differ greatly. Most of the ethnic Chinese in Thailand used to be labour immigrants, who came from the southern China area after the 19th century, as well as their descendants. Statistics by hometown indicate that these Chinese are overwhelmingly from Chaozhou. Their "native languages" are the Chaozhou dialect and the Fujian language. It was in the 1920's, after the establishment of the Republic of China, that the so-called

"Chinese language (standard Chinese)" spread in the ethnic Chinese society as a common language.

Influenced by the upsurge of nationalism in mainland China and the spread of standard Chinese, a common identity as "Chinese" beyond the *bang* was born among the Thai ethnic Chinese. On the other hand, Thai nationalism rose through the constitutional revolution of 1932 in Thailand and it was antagonistic to the nationalism of the ethnic Chinese. The fact that "the Four Books and the Five Classics" were taught to children in private classes built by the ethnic Chinese in Thailand after the 14th century is known. Moving our focus to the 20th century, until the shift to the constitutional monarchy in 1932, each *bang* founded many of their own schools, such as Xinmin Xuetang (新民学堂), Datong Xuetang (大同学堂, later renamed as Nanying Xuetang 南英学), the Honghua (宏華) School, the Yucai (育才) School, the Jinde (進德) School, the Mingde (明德) School, the Peiyuan (培元) School, and the Peiying (培英) School under a permissive attitude toward Chinese language education of the Thai government.

The Private School Law enacted in 1918 by King Rama VI and the Compulsory Education Enforcement Ordinance in 1921 were not executed very strictly at first. However, after shifting to the constitutional monarchy in 1932, the situation changed, and a tightening of the rules progressed. The class hours per week for the Chinese language were limited to less than six hours, and the use of textbooks including political contents was forbidden. In the period from 1933 to 1935, about 300 Chinese language schools closed.

Despite facing difficulties, during the period dating from 1932 to 1939 Chinese language education in Thailand still continued to develop. Because the severe Chinese language education policy led to the dissatisfaction of many overseas Chinese and ethnic Chinese who grasped economic strength and exercised a negative influence on the Thai economy, the Thai government could not help but revise the policy. The Nationalist Government of China, on the other hand, offered support to Chinese language schools. However, when Luang Pibulsonggram took the post of prime minister in 1938, he executed an exhaustive control against Chinese language education under his pro-Japan and anti-China policy. Chinese language education experienced the greatest period of challenge in its history in Thailand and all 294 Chinese language schools which existed at that time disappeared (Murata, 2007, p. 164-172).

After World War II, Chinese language schools were resurrected for a brief period from 1945 to 1948. However, after the founding of the People's Republic of China in 1949, Thailand, which occupied one corner of an anticommunist camp, forced Chinese language education to adhere to a myriad of controls and limitations (Hiizumi, 1987, p. 129-130; Murata, 2007, p. 174-176), that is, the class hours for Chinese language study were restricted, and actions to close the schools were taken up again. Such severe control was mitigated in 1992 by a decision by the Cabinet led by Prime Minister, Anand Panyarachun, to end the long period of limits (Suzuki, 1995, p. 88-89).

Moreover, when formal talks between the Thai Minister of Education, Chaturon Chaisangon, and China's Vice Minister of Education, Zhang Xinsheng, were held on January 11, 2006 and were followed by an agreement of support for Chinese education in Thailand, hospitable assistance by China started. The assistance included the dispatch

of Chinese language education volunteer teachers from China, the training of Thai teachers specializing in Chinese language education, and the establishment of the Confucius Institute, which is overseen by the Confucius Institute Headquarters (hereafter "Hanban"). The Thai Ministry of Education founded Chinese language educational centers in 20 locations all over the country in 2007 to attain the standardization of teaching methods and curricula. It also decided to establish a Chinese language teacher training course. However, such actions do not aim to teach the Chinese language as an ethnic language to ethnic Chinese people (Tamaki, 2007), but it is consistently maintained that the purpose is to teach the Chinese language as a foreign language just as other languages such as English and Japanese are taught. In celebrating the 35th anniversary of the normalization of diplomatic relations between the two countries in 2010, a further boom in Chinese language education appeared in Thailand.

Today, the population of overseas Chinese and ethnic Chinese in Indonesia reaches about 7,400,000 and accounts for 3.5% of the total population and constitutes the greatest ethnic minority in the country (Yannan, 2005). The history of Chinese language education in Indonesia can be traced back to 1690 when Mingcheng Shuyan (明誠書院), a private academy, was opened by overseas Chinese in Batavia (present Jakarta). Then, the traditional private academies with Chinese language as a medium of instruction were built in various places. The Four-Books and Five Classics were taught at those academies, which were opened by the overseas Chinese merchants from Fujian or Guangdong provinces, and teachers also taught in the Fujian dialect or in Cantonese.

In the 20th century, overseas Chinese founded the Chinese School Attached to Batavia Chinese Hall (中華会館中華学校) on March 17, 1901, which was a forerunner of modern schools. Subsequently, the Chinese General Assembly (中華総会) was established in 1906 and it was renamed as the Java School Affairs General Assembly (爪哇学務総会). It functioned as an organization to control Chinese language education in the whole country. Unlike the above-mentioned private academies, modern schools came to teach modern subjects such as arithmetic, geography, English, and gymnastics in addition to Chinese language and history.

The media of instruction was neither the Fujian dialect nor Cantonese any longer but was changed to the "national language", "Mandarin", the standard Chinese based on the Beijing dialect. However, Chinese language education soon declined under the suppression dictated by the Dutch colonial government as well as during the war. The ethnic Chinese people were suppressed during the Japanese war-time administration for three and a half years. After World War II, Chinese language education temporarily showed a sign of prospering again under a relatively tolerant policy over Chinese language education by the new government after the independence. Chinese language schools in Indonesia numbered about 200, with 425,000 students enrolled in 1957 (Yu-e & Lei, n.d). However, the Sukarno Administration gradually expressed concern over too great of a proliferation of Chinese language education and eventually came to add various kinds of restrictions. That is, a new Chinese language school was forbidden to be established, students with Indonesian nationality were prohibited from attending any Chinese language school, and the zone to build a Chinese language school was restricted. This intensified when the

Sukarno Administration collapsed with the September 30, 1965 coup détat led by Suharto. Chinese language education faced a much more serious situation under President Suharto, who assumed power. Suharto thoroughly executed an assimilation policy for ethic Chinese in Indonesia, he forbade the use of the Chinese language, and closed down Chinese language schools. In this way, the Chinese language and its education was oppressed and forbidden for more than 30 years.

However, as Indonesia's relations with mainland China improved in the realm of international politics and economic exchanges, an unprecedented change arose with the ethnic Chinese and their native language. The previous policy forbidding the use of Chinese language was reviewed. Furthermore, an understanding of the Chinese language and a tolerant policy have been further strengthened under the administrations of Presidents Wahid, Megawati, and Yudhoyono. Plans to vigorously promote Chinese language education were adopted, and the Chinese language came to be learned as one of the foreign language subjects.

From the end of 2000 to the beginning of 2001, the Indonesian Ministry of Education in cooperation with the Chinese Ministry of Education as well as the Cultural Affairs Department of the Chinese Embassy in Indonesia tried to enforce bilateral relations involving Chinese language education. These efforts included, for example, setting up a special section in the Ministry to advance the unification of teaching materials, letting the Chinese language educational adviser dispatched from China stay regularly within the Ministry of Education, and taking a series of measures for the implementation of HSK examinations (Guwen, 2001; Otsuka, 2015, p. 49-65).

Ethnic Chinese is one of the 54 ethnic groups constituting the Vietnamese people. According to an existing statistic, as of 2015, the population of ethnic Chinese was 1,891,000,which is about 2.0% of the total population of 84 million (Saigon Liberation Daily, 2010). It is said that around half reside in Ho Chi Minh City. As for Chinese language education, it is common to distinguish Hua Yu (華語) from Han Yu (漢語). The former is to maintain and accede the ethnic Chinese people's language and culture as one of the ethnic minorities, while the latter is to be taught as a foreign language. Chinese language education, known as Hua Yu education, is conducted mainly in the 5th division (Cho Lon area), as well as the 6th and the 11th divisions where the ethnic Chinese people are concentrated in Ho Chi Minh City. From a nationwide perspective, Chinese language education is also carried out in some southern provinces, such as Binh Duong, Dong Nai, and Can Tho in addition to Ho Chi Minh City.

China and Vietnam, two countries sharing a border, have been inter-communicating since ancient times. Historical records state that the ethnic Chinese came to reside permanently in Vietnam in excess of 1000 years, and especially from the end of the Ming Dynasty to the beginning of the Qing Dynasty in the 17th century. The surviving retainers of Ming moved to Vietnam in droves. From the end of the 19th century end to the beginning of the 20th century, under the French colony, Saigon (present Ho Chi Minh City) attracted many overseas Chinese as a large trade base in Southeast Asia. Then, during the separation of north and south for 20 years from 1954, the ethnic Chinese people substantially controlled the business community, and they established strong roots in Vietnamese society.

However, after the north-south unification in 1975, the ethnic Chinese who feared oppression under communism fled the country. Also, the number of ethnic Chinese who went abroad increased before and after the China-Vietnam War in 1979 which broke out due to a confrontation between two communist parties. Under such extraordinary circumstances between the two countries, the influence of the ethnic Chinese in Vietnam declined extremely, and so too did Chinese language education. Both Hua Yu and Han Yu education were substantially interrupted or stagnated for 10 years from the beginning of the 80s until around 1992.

However, in 1986 as the Vietnamese government introduced the "doi moi" policy, which was a move away from a planned economy to a market economy, it actively pursued economic and cultural exchanges with other nations. The personal connections of the ethnic Chinese played a significant role in introducing foreign capital and technology. Investors using the Chinese language from areas such as Taiwan, Hong Kong, and Singapore became the main force for the introduction of foreign capital to Vietnam. In this context, a warming of relations appeared between China and Vietnam from the late 1990s. The demand for Chinese language as a foreign language as well as an ethnic minority's native language increased gradually, and various kinds of educational activities came to be developed (Otsuka, 2008, p. 127-145). It was overseas Chinese and ethnic Chinese that substantially supported such movement.

Each country has thus far experienced various deployments of Chinese language education. In order to clarify what kind of attitudes pupils and students of elementary and secondary schools have toward Chinese language education after such changes, therefore the questionnaire surveys was need in that four nations.

METHOD

This research took place in four nations (Cambodia, Indonesia, Thailand. and Vietnam) for a few years beginning in 2014. Questionnaires were prepared both in Chinese and in the language of each respective country, with the help of teachers in charge in each classroom and we received some support from locals in each country (Otsuka, 2008, p. 127-145).

We chose the following schools and areas as targets of our questionnaire survey, since some countries have not long carried out Chinese language education and have not necessarily carried it out throughout the country. That is, schools run by ethnic Chinese which have adopted the Chinese language as the medium of instruction, or areas where relatively numerous ethnic Chinese residents live and and Chinese language is adopted as a part of teaching subjects were chosen.

Since the Chinese language is not widely taught at ordinary schools in Cambodia, two schools named Duan Hua and Li Qun were chosen. They are run by ethnic Chinese and they are proud of their long history, and almost all of their registered students are children of ethnic Chinese. Since the Chinese language is studied as a foreign language in Indonesia, ten ordinary elementary and secondary schools of the cities Semarang, Salatiga, and Surabaya, where ethnic Chinese are relatively concentrated, were chosen as survey targets.

In Thailand, as was mentioned previously, the Chinese language is studied as a foreign language along with English and Japanese; however, schools with a comparatively large enrollment of ethnic Chinese children such as the Guanjiao School and the Trymit School were chosen for the survey. In Vietnam, it was possible to investigate in Bac Lieu Province in the

south and Lang Son Province and Hanoi City in the north, in addition to Ho Chi Minh City, where the ethnic Chinese residents are concentrated in the south, and thus quite a wide range of primary schools and junior and senior high schools all over the country were included.

The total number of respondents was 2,458 with a breakdown by country of: 631 in Cambodia, 367 in Thailand, 843 in Indonesia, and 617 in Vietnam. As for the respondent's qualitative attributes, 1,116 (45.5%) were high school students. This group accounted for a little less than half of the 2,452 persons who included information about their own grade level. Additionally, there were 917 elementary school children (37.4%) and 419 junior high school students (17.1%). Thus, the sample is a little skewed toward the high school student group. Therefore, we decided to refrain from analyzing the data by kind of school, age, and grade. There were 1,005 males (41.3%) and 1,427 females (58.7%) among the 2,432 respondents who indicated their gender.

Questionnaire consists of eight questions covering about the question of respondent's ethnicity, frequency of using chinese language daily, learning of english or other foreign languages, length of Chinese language learning, interest and concern about Chinese language learning, difficulties in chinese language learning, the reasons to learn the Chinese language, and the wish for studying-abroad.

RESEARCH RESULTS AND DISCUSSION

In order to clarify what kind of attitudes pupils and students of elementary and secondary schools have toward Chinese language education after changed, it can be seen from the eight questions in this survey.

The respondent's ethnicity. With regard to the question of respondent's ethnicity, "whether you are posterity of overseas Chinese or ethnic Chinese (華裔, hereafter described as Chinese posterity)," 66.7% of the 2,416 respondents answered "yes". Table 1 presents data regarding reply to the question of respondent's ethnicity.

Seen by country, it shows that the percentage of people with either Chinese posterity or Chinese ethnicity is the highest in Cambodia and ranges through to the lowest percentage, which is in Vietnam. It is difficult to determine even a rough approximation of the percentage of the ethnic Chinese population with the available data, as the number varies from study to study as mentioned above.

That is, the lack of concrete population data makes it impossible to ascertain an accurate ratio of Chinese posterity existent to those surveyed in this research. However, because the estimated range is from only a few percent to about ten percent, the ratio of the ethnic Chinese population in this survey is very high in light of the factual composition ratio of each investigated country. Therefore, judging from the total number of ethnic Chinese in the parent population, respondents to this survey do not necessarily reflect the parent population. Incidentally, except for all target schools of this survey in Cambodia being ethnic Chinese schools, schools surveyed in the other three countries are a mixture of schools mainly taught in Chinese language and other ordinary schools where Chinese language is taught as a subject. On the other hand, even at the ethnic Chinese schools in Cambodia, non-ethnic Chinese children are also enrolled.

In the following analysis of the question responses, it is possible to better understand the impact of the influence of various conditions of each respective country and ethnicity situation on the state of Chinese language education through comparison of different countries and the difference

Table 1
Reply to The Question of Respondent's Ethnicity (χ2=299.604, df=3, p<.001)

			Chinese Posterity		Total
			Yes	No	
Country	Cambodia	frequency	549	64	613
		% of country	89.6%	10.4%	100.0%
		% of total	22.7%	2.6%	25.4%
	Thailand	frequency	254	112	366
		% of country	69.4%	30.6%	100.0%
		% of total	10.5%	4.6%	15.1%
	Indonesia	frequency	552	285	837
		% of country	65.9%	34.1%	100.0%
		% of total	22.8%	11.8%	34.6%
	Vietnam	frequency	257	343	600
		% of country	42.8%	57.2%	100.0%
		% of total	10.6%	14.2%	24.8%
Total		frequency	1612	804	2416
		% of country	66.7%	33.3%	100.0%
		% of total	66.7%	33.3%	100.0%

depending on whether the respondents are ethnic Chinese or not.

Frequency of using chinese language daily. In the question "Is there any person daily using Chinese language in your home or among your relatives?", there were more positive answers (57.3%) than negative answers (42.7%) as indicated in the total column of Table 2. Focusing on only Chinese posterity, it turns out that there is someone using the Chinese language on a daily basis in as many as three fourth of the respondents' homes as shown in the upper row of Table 2. It seems that the children of these Chinese posterities have more chances to touch Chinese language every day.

Table 2
The Difference of Frequency in Use of The Chinese Language between Ethnic Chinese and Non-ethnic Chinese (χ2=655.477, df=3, p<.001)

			Chinese Used at Home ***		Total
			Yes	No	
Chinese posterity or not	Yes	frequency	1210	387	1597
		% of Chinese posterity	75.8%	24.2%	100.0%
		% of total	50.5%	16.1%	66.6%
	No	frequency	164	636	800
		% of Chinese posterity	20.5%	79.5%	100.0%
		% of total	6.8%	26.5%	33.4%
Total		frequency	1374	1023	2397
		% of Chinese posterity	57.3%	42.7%	100.0%
		% of total	57.3%	42.7%	100.0%

Checking by country, while as the highest with 69.2% answering in the affirmative was in Cambodia where nearly 90 percent of respondents are Chinese posterity, only a half of the ratio answered "yes" in Vietnam where 42.8% of respondents are Chinese posterity, as shown in Table 3.

Comparing the ratio of Chinese posterity and non-Chinese posterity with the frequency of use of Chinese language at home, the Chinese language usage ratio in Thailand is a little low and is still lower in Vietnam, while it is almost well-balanced in Indonesia. Even if taking the fact that the surveyed schools in Cambodia were Chinese language schools while those in Vietnam were ordinary schools into consideration, the degree of Chinese language used daily in the Vietnamese home is particularly low. This level of usage can be contrasted with Thai and Indonesian schools, which were the same as Vietnamese schools in that they were not limited to Chinese language schools.

Learning of english or other foreign languages. As a question to clarify the position of the Chinese language in the study of foreign languages, "Are you studying English in your school in addition to the Chinese language?" was asked. To this question, 2,156 students (88.9%), who are the overwhelming majority of the total 2,422 respondents, answered that they are studying English, as shown in the total column of Table 4.

Although the ratio of those who are not studying English is relatively high (22.4%) in Cambodia, this is because the investigated schools were ethnic Chinese institutions. As mentioned above, the Chinese language schools in Cambodia which carry out the trilingual education in Khmer and English in addition to Chinese language as a policy to attract more students and to respond to increasing demands for English in recent years.

Following the question concerning English learning, a question, "whether another language (except for English) is

Table 3
How Often Chinese Language Used at Home in Each Contry ($\chi 2=172.933$, $df=3$, $p<.001$)

			Someone Daily Use Chinese at Home		Total
			Yes	No	
Country	Cambodia	frequency	426	190	616
		% of country	69.2%	30.8%	100.0%
		% of total	17.5%	7.8%	25.3%
	Thailand	frequency	220	147	367
		% of country	59.9%	40.1%	100.0%
		% of total	9.1%	6.0%	15.1%
	Indonesia	frequency	533	306	839
		% of country	63.5%	36.5%	100.0%
		% of total	21.9%	12.6%	34.5%
	Vietnam	frequency	213	395	608
		% of country	35.0%	65.0%	100.0%
		% of total	8.8%	16.3%	25.0%
Total		frequency	1392	1038	2430
		% of country	57.3%	42.7%	100.0%
		% of total	57.3%	42.7%	100.0%

Table 4
English Learning in School ($\chi 2=208.228$, $df=3$, $p<.001$)

			Yes	No	Total
Country	Cambodia	frequency	475	137	612
		% of country	77.6%	22.4%	100.0%
		% of total	19.6%	5.7%	25.2%
	Thailand	frequency	361	6	367
		% of country	98.4%	1.6%	100.0%
		% of total	14.9%	.2%	15.1%
	Indonesia	frequency	823	18	841
		% of country	97.9%	2.1%	100.0%
		% of total	34.0%	.7%	34.7%
	Vietnam	frequency	497	107	604
		% of country	82.3%	17.7%	100.0%
		% of total	20.5%	4-4%	24.9%
Total		frequency	2156	268	2424
		% of country	88.9%	11.1%	100.0%
		% of total	88.9%	11.1%	100.0%

studied in addition to Chinese language in your school" was asked. About three fourths of the total students answered "No." Particularly, 91.3% of Vietnamese students are not studying other languages as shown in the total column of Table 5.

Length of Chinese language learning. The distribution of all respondents to a question "How long have you been learning the Chinese language?" is shown in Table 6. No less than 60% of 2,431 respondants. have been learning the Chinese language for more than three years. Looking at the result by country, the ratio of those who have learned the Chinese language for three years or more is as high as 94.9% in Cambodia. On the other hand, in Vietnam, the number who are learning for three years or more is 44.7%, while 30.6% of students have just begun and have been learning for less than half a year.

Interest and concern about Chinese language learning. Although the length of learning varies from respondent to respondent, when they were asked whether Chinese language learning was "interesting", about 90%, the overwhelming majority, answered that is was "interesting." As shown in Table 7, all respondents in Cambodia answered "interesting".

Difficulties in chinese language learning. When asked whether Chinese language learning is difficult, as shown in Table 8, those who answered "difficult" were a majority in each of the countries, but it is conspicuous that as many as 80 percent answered "difficult" in Thailand.

As for the difference between Chinese posterities and non-Chinese posterities, those who think "difficult" in the four countries account for 58.2% of ethnic Chinese and 65.7% of non-Chinese posterities. There are more students who feel difficulty among non-Chinese posterities, who do not inherit Chinese blood, and a statistically significant difference is seen in this result ($\chi 2=12.541$, $df=3$, $p<.001$).

Table 5
Other language (Except for English) Studied in Addition to Chinese Language in School? (χ2=214.021, df=3, p<.001)

			Learning of Another Language Besides English		Total
			Yes	No	
Country	Cambodia	frequency	161	448	609
		% of country	26.4%	73.6%	100.0%
		% of total	6.6%	18.5%	25.1%
	Thailand	frequency	186	180	366
		% of country	50.8%	49.2%	100.0%
		% of total	7.7%	7.4%	15.1%
	Indonesia	frequency	260	579	839
		% of country	31.0%	69.0%	100.0%
		% of total	10.7%	23.9%	34.6%
	Vietnam	frequency	53	555	608
		% of country	8.7%	91.3%	100.0%
		% of total	2.2%	22.9%	25.1%
	Total	frequency	660	1762	2422
		% of country	27.3%	72.7%	100.0%
		% of total	27.3%	72.7%	100.0%

Table 6
Length of Chinese Language Learning (All Respondents) (χ2=649.933, df=3, p.001)

			How Long Have You Been Learning Chinese?					Total
			Less than 6 Months	6 Months-1 Year	1-2 Years	2-3 Years	more than 3 Years	
Country	Cambodia	frequency	1	8	21	2	595	627
		% of country	.2%	1.3%	3.3%	.3%	94.9%	100.0%
		% of total	.0%	.3%	.9%	.1%	24.5%	25.8%
	Thailand	frequency	15	59	43	83	165	365
		% of country	4.1%	16.2%	11.8%	22.7%	45.2%	100.0%
		% of total	.6%	2.4%	1.8%	3.4%	6.8%	15.0%
	Indonesia	frequency	147	62	82	105	439	835
		% of country	17.6%	7.4%	9.8%	12.6%	52.6%	100.0%
		% of total	6.0%	2.6%	3.4%	4.3%	18.1%	34.3%
	Vietnam	frequency	185	33	74	42	270	604
		% of country	30.6%	5.5%	12.3%	7.0%	44.7%	100.0%
		% of total	7.6%	1.4%	3.0%	1.7%	11.1%	24.8%
	Total	frequency	348	162	220	232	1469	2431
		% of country	14.3%	6.7%	9.0%	9.5%	60.4%	100.0%
		% of total	14.3%	6.7%	9.0%	9.5%	60.4%	100.0%

Table 7
The Interest of Learning Chinese (χ2=109.421, df=3, p<.001)

			Interesting	Not Interesting	Total
Country	Cambodia	frequency	626	0	626
		% of country	100.0%	0.0%	100.0%
		% of total	25.7%	0.0%	25.7%
	Thailand	frequency	299	67	366
		% of country	81.7%	18.3%	100.0%
		% of total	12.3%	2.7%	15.0%
	Indonesia	frequency	727	112	839
		% of country	86.7%	13.3%	100.0%
		% of total	29.8%	4.6%	34.4%
	Vietnam	frequency	520	86	606
		% of country	85.8%	14.2%	100.0%
		% of total	21.3%	3.5%	24.9%
Total		frequency	2172	265	2437
		% of country	89.1%	10.9%	100.0%
		% of total	89.1%	10.9%	100.0%

Table 8
Chinese Language Learning Difficulty (χ2=68.919, df=3, p<.001)

			Chinese Language Learning Difficulty		Total
			Difficult	Not Difficult	
Country	Cambodia	frequency	346	277	623
		% of country	55.5%	44.5%	100.0%
		% of total	14.2%	11.4%	25.6%
	Thailand	frequency	294	73	367
		% of country	80.1%	19.9%	100.0%
		% of total	12.1%	3.0%	15.1%
	Indonesia	frequency	484	349	833
		% of country	58.1%	41.9%	100.0%
		% of total	19.9%	14.3%	34.2%
	Vietnam	frequency	355	255	610
		% of country	58.2%	41.8%	100.0%
		% of total	14.6%	10.5%	25.1%
Total		frequency	1479	954	2433
		% of country	60.8%	39.2%	100.0%
		% of total	60.8%	39.2%	100.0%

It seems that a correlation may be seen between thinking "interesting" and "difficult" in Chinese language learning. It is certain that those who think "difficult" feel "not interesting" as shown in all respondents' situation in Table 9.

Table 10 indicates how the Chinese lineage relates to the feeling of difficulty in Chinese language learning by country. Although it is surmised that being a Chinese posterity is a factor letting the student feel Chinese language learning is not difficult, only Thailand looks like an exception in that the Chinese lineage does not affect the perceived difficulty level of Chinese language learning very much.

Table 11 shows the number and ratio of students who feels "difficult" or "not difficult" within three domains of Chinese learning, i.e. pronunciation, grammar, and the writing of characters among those who have studied for more than three years and are considered considerably proficient in the language. As for the relation between a country and difficulties in each of three domains, a statistically significant difference can be found in pronunciation and writing at the 0.1% level, and in grammar at the 1% level.

Thai language belongs to Sino-Tibetan language family and is close to Cantonese, and Vietnamese language contains many Chinese origin words because it was influenced by Chinese for thousands of years; however, it belongs to a different language family: Monn- Khmer. These facts come to mind, yet since such confounding factors such as student's attitude and teacher capability are also involved, specifying the causes for this result is not easy.

Table 12 shows which of the three domains of language learning is felt to be difficult correlated with whether the respondents inherit Chinese blood or not. Except for pronunciation, a statistically significant difference is found in grammar and writing at the 0.1% and 5% level respectively. While no statistically significant difference was found in grammar and writing by sex, a statistically significant difference was only identified with the result of pronunciation. That is, 61.1% of the males answered "difficult" and 49.5% of females answered "difficult" ($\chi 2=31.567$, df=1, $p<.001$).

The reasons to learn the Chinese language. In the questionnaire survey, students were asked what factors influenced their decision to come and learn Chinese (up to three reasons could be chosen). Table 13 shows the results by country.

It turns out that there are many students who have a realistic recognition that "it will probably be useful in the future", if they learn Chinese. It is also backed up by the recognition that the "Chinese language is

Table 9
Correlation between Interest and Difficulty ($\chi 2=100.073$, df=1, $p<.001$)

			Chinese Language Learning Difficulty		Total
			Yes	No	
Ethnic Chinese	Yes	frequency	1232	920	2152
		% of interesting	57.2%	42.8%	100.0%
		% of total	51.1%	38.1%	89.2%
	No	frequency	233	28	261
		% of interesting	89.3%	10.7%	100.0%
		% of total	9.7%	1.2%	10.8%
Total		frequency	1465	948	2413
		% of interesting	60.7%	39.3%	100.0%
		% of total	60.7%	39.3%	100.0%

Table 10
Chinese Language Learning Difficulty Felt by Ethnic Chinese and Not-Ethnic Chinese in 4 Countries (X2=258.571, Df=3, P<.001)

				Cambodia	Thailand	Indonesia	Vietnam	Total
Difficult	Ethnic Chinese	Yes	Frequency	294	204	327	106	931
			% of ethnic Chinese	31.6%	21.9%	35.1%	4%	100.0%
			% of total	20.2%	14.0%	22.5%	7.3%	64.1%
		No	Frequency	38	89	156	238	521
			% of ethnic Chinese	7.3%	17.1%	29.9%	45.7%	100.0%
			% of total	2.6%	6.1%	10.7%	16.4%	35.9%
	Total		Frequency	332	293	483	344	1452
			% of ethnic Chinese	22.9%	20.2%	33.3%	23.7%	100.0%
			% of total	22.9%	20.2%	33.3%	23.7%	100.0%
Not Difficult	Ethnic Chinese	Yes	Frequency	248	50	221	150	669
			% of ethnic Chinese	37.1%	7.5%	33.0%	22.4%	100.0%
			% of total	26.4%	5.3%	23.5%	15.9%	71.1%
		No	Frequency	25	23	124	100	272
			% of ethnic Chinese	9.2%	8.5%	45.6%	36.8%	100.0%
			% of total	2.7%	2.4%	13.2%	10.6%	28.9%
	Total		Frequency	273	73	345	250	941
			% of ethnic Chinese	29.0%	7.8%	36.7%	26.6%	100.0%
			% of total	29.0%	7.8%	36.7%	26.6%	100.0%
Total	Ethnic Chinese	Yes	Frequency	542	254	548	256	1600
			% of ethnic Chinese	33.9%	15.9%	34.3%	16.0%	100.0%
			% of total	22.6%	10.6%	22.9%	10.7%	66.9%
		No	Frequency	63	112	280	338	793
			% of ethnic Chinese	7.9%	14.1%	35.3%	42.6%	100.0%
			% of total	2.6%	4.7%	11.7%	14.1%	33.1%
	Total		Frequency	605	366	828	594	2393
			% of ethnic Chinese	25.3%	15.3%	34.6%	24.8%	100.0%
			% of total	25.3%	15.3%	34.6%	24.8%	100.0%

an international language on a par with English", and these two reasons were almost equally valued. There were some students who wrote "Chinese language will turn into an international language in the future since China is a country developing very quickly" (Cambodia, grade 1 of high school, a male), and "Because there are many opportunities to get a scholarship and a job if we study the Chinese language (except for English)" (Vietnam, grade 1 of high school, a female) in the free description column. In addition to these, about 30 percent of respondents chose "having been interested from the beginning" even if vaguely and "being interested in Chinese culture and history" and as a means to understand Chinese cultural more deeply. Moreover, those who answered that it is because it was "recommended by parents" also accounted for 30 percent. There are few who chose a

Table 11

Difficulties in Three Domains of Chinese Learning Felt by those Who have Studied More than 3 Years

		Pronunciation (***χ2=62.939, df=3, p<.001***)			Grammar (***χ2=12.177, df=3, p<.01***)			Writing (***χ2=65.404, df=3, p<.001***)		
		Difficult	Not Difficult	Total	Difficult	Not Difficult	Total	Difficult	Not Difficult	Total
Cambodia	persons	316	277	593	398	188	586	228	362	590
	%	53.3%	46.7%	100.0%	67.9%	32.1%	100.0%	38.6%	61.4%	100.0%
Thailand	persons	102	63	165	120	43	163	95	70	165
	%	61.8%	38.2%	100.0%	73.6%	26.4%	100.0%	57.6%	42.4%	100.0%
Indonesia	persons	285	150	435	287	146	433	268	167	435
	%	65.5%	34.5%	100.0%	66.3%	33.7%	100.0%	61.6%	38.4%	100.0%
Vietnam	persons	96	172	268	157	112	269	108	160	268
	%	35.8%	64.2%	100.0%	58.4%	41.6%	100.0%	40.3%	59.7%	100.0%
Total	persons	799	662	1461	962	489	1451	699	759	1458
	%	54.7%	45.3%	100.0%	66.3%	33.7%	100.0%	47.9%	52.1%	100.0%

Table 12

Domain Felt Difficult by Chinese Posterity and Non-Chinese Posterity

			Pronunciation			Grammar*			Writing***		
			Difficult	Not Difficult	Total	Difficult	Not Difficult	Total	Difficult	Not Difficult	Total
Ethnic Chinese	Yes	frequency	885	721	1606	1037	558	1595	784	815	1599
		% of ethnic Chinese	55.1%	44.9%	100.0%	65.0%	35.0%	100.0%	49.0%	51.0%	100.0%
		% of total	36.9%	30.0%	66.9%	43.4%	23.3%	66.7%	32.7%	34.0%	66.8%
	No	frequency	429	336	795	550	245	795	550	245	795
		% of ethnic Chinese	54.0%	46.0%	100.0%	69.2%	30.8%	100.0%	69.2%	30.8%	100.0%
		% of total	17.9%	15.2%	33.1%	23.0%	10.3%	33.3%	23.0%	10.2%	33.2%
Total		frequency	1314	1087	2401	1587	803	2390	1334	1060	2394
		% of ethnic Chinese	54.7%	45.3%	100.0%	66.4%	33.6%	100.0%	55.7%	44.3%	100.0%
		% of total	54.7%	45.3%	100.0%	66.4%	33.6%	100.0%	55.7%	44.3%	100.0%
	χ2=.281, df=1, p<.596			χ2=4.129, df=1, p<.05			χ2=87.398, df=1, p<.001			

Table 13
Reasons to Have Chosen Chinese Language Learning (All Respondents)

		Useful in the Future	Interested from the Beginning	Interest in Chinese Culture & History	Inter-national Language	Persuaded by Parents	Friends Chose to Study
Cambodia	frequency	587	273	311	511	106	15
	% of country	93.0%	43.3%	49.3%	81.0%	16.8%	2.4%
	% of total	23.9%	11.1%	12.7%	20.8%	4.3%	0.6%
Thailand	frequency	270	116	62	265	170	40
	% of country	73.6%	31.6%	16.9%	72.2%	46.3%	10.9%
	% of total	11.0%	4.7%	2.5%	10.8%	6.9%	1.6%
Indonesia	frequency	436	201	153	389	190	34
	% of country	51.7%	18.1%	18.1%	46.10%	22.5%	1.0%
	% of total	17.70%	6.2%	6.2%	15.80%	7.7%	1.4%
Vietnam	frequency	286%	223	212	402	275	76
	% of country	46.4%	36.1%	34.4%	65.2%	44.6%	12.3%
	% of total	11.6%	9.1%	8.6%	16.4%	11.2%	3.1%
Total	frequency	1579	813	738	1567	741	165
	% of country	64.2%	33.1%	30.0%	63.8%	30.1%	6.7%
	% of total	64.2%	33.1%	30.0%	63.8%	30.1%	6.7%

passive reason like "It is because friends chose to study Chinese language", and thus almost all of the respondents are learning the Chinese language for positive reasons. Some students wrote "It is because I like a Chinese music group" (Vietnam, grade 1 of high school, female), and "It is because I was assigned to the Chinese class as a result of the entrance examination" (Vietnam, grade 3 of high school, female) in the free description column. Judging from the free description, those with good academic performance seem to be assigned to an English class in Vietnam.

Looking at the reply about the reasons to learn Chinese language by sex, only those who chose the reason "Having been interested from the beginning" (27.0% for males, 37.7% for females) has a statistically significant difference ($\chi 2=30.619$, $df=1$, $p<.001$). Next, Table 14 shows the reasons to learn the Chinese language only for the ethnic Chinese.

Chinese posterity in Cambodia and Thailand has shown an especially high ratio of those who chose to learn Chinese language based upon a practical viewpoint such as "it will be helpful in the future" and "since it is an international language." On the other hand, Chinese posterity in Thailand and Vietnam has shown a high ratio of those who chose "because it was recommended by parents", and especially Chinese posterity in Vietnam is about twenty percent higher than the response given by others regardless of Chinese posterity or non-Chinese posterity of the country.

This is also statistically significant and could be explained as dedication to the Chinese language of the parental generation. Some students wrote "My

Table 14
*Reasons for Having Chosen the Chinese Language among the Chinese Posterity Only by Country (*X2*=221.617, Df=3, P<.001)*

		Useful in the Future	Interested from the Beginning	Interest in Chinese Culture & History	Inter-national Language	Persuaded by Parents	Friends Chose to Study
Cambodia	frequency	514	245	271	442	85	11
	% of country	93.6%	44.6%	49.4%	80.5%	15.5%	2.0%
	% of total	31.9%	15.2%	16.8%	27.4%	5.3%	0.7%
Thailand	frequency	183	76	47	183	129	26
	% of country	72.0%	29.9%	18.5%	72.0%	50.8%	10.2%
	% of total	11.4%	4.7%	2.9%	11.4%	8.0%	1.6%
Indonesia	frequency	279	108	103	248	167	29
	% of country	50.5%	19.6%	18.7%	44.9%	30.3%	5.3%
	% of total	17.3%	6.7%	6.4%	15.4%	10.4%	1.8%
Vietnam	frequency	122	81	81	142	164	47
	% of country	47.5%	31.5%	31.5%	55.3%	63.8%	18.3%
	% of total	7.6%	5.0%	5.0%	8.8%	10.2%	2.9%
Total	frequency	1098	502	502	1015	545	113
	% of country	68.1%	31.1%	31.1%	63.0%	33.8%	7.0%
	% of total	68.1%	31.1%	31.1%	63.0%	33.8%	7.0%

parents have advised me to study the Chinese language which is the ancestral language, since all families are ethnic Chinese" (Vietnam, grade 1 of junior high school, female), "I am an ethnic Chinese and my parents persuaded me to study the Chinese language" (Vietnam, grade 4 of junior high school, male), "My purpose is to study Japanese in the future. Since the Chinese language and Japanese are akin, if the Chinese language is studied firmly, it will be useful for studying Japanese in the future" (Vietnam, grade 4 of junior high school, male) in the free description column.

The wish for studying-abroad. To the question, "Do you want to study in China (not only in the Mainland but in Hong Kong or Taiwan) in the future, if there is an opportunity?", as shown in Table 15, those who answered "Yes" were 75.2 percent, which is three times more than those who answered "No" at 24.8%.

The ratio of those with Chinese posterity wishing to study abroad is almost the same as the number without Chinese posterity. In addition, looking at the difference by sex, 69.3 percent of males and 79.1 percent of females answered "I would like to study abroad", females are more positive, and a statistically significant difference was found ($\chi 2=29.964$, $df=1$, $p<.001$).

A wish to study abroad may also change with the length of time spent learning the Chinese language. Among those who have just begun to study the Chinese language, there are many (80 percent or more) hoping to study abroad as shown in Fig. 1. However, while continuing to study, it is surmised that an awareness

Table 15
Difference of Wish for Study-Abroad between Chinese Posterity and Non-Chinese Posterity ($\chi 2=16.615$, $df=1$, $p<.001$)

			Wish for Study Abroad		Total
			Yes	No	
Ethnic Chinese	Yes	frequency	1228	352	1580
		% of Chinese posterity	77.7%	22.3%	100.0%
		% of total	51.7%	14.8%	66.5%
	No	frequency	557	238	795
		% of Chinese posterity	70.1%	29.9%	100.0%
		% of total	23.5%	10.0%	33.5%
Total		frequency	1785	590	2375
		% of Chinese posterity	75.2%	24.8%	100.0%
		% of total	75.2%	24.8%	100.0%

of the difficulties of the Chinese language increases. Therefore, the ratio of those wishing to study abroad falls gradually as mentioned above. However, those who have learned for three years or more, unlike the beginners, can feel confident about language acquisition and increasingly wish to study abroad. The difference by country can be seen here.

As shown in Table 16, compared with the three other countries, those wishing to study abroad in Vietnam account for 59.6 percent which is 30 percent less than Cambodia and 15 percent less than the average of the four countries.

If there is a favorability rating survey of interest in countries such as the Country Rating Poll carried out by the British

Fig. 1. Change of Hope for Studying Abroad by the Length of Learning of Chinese Language

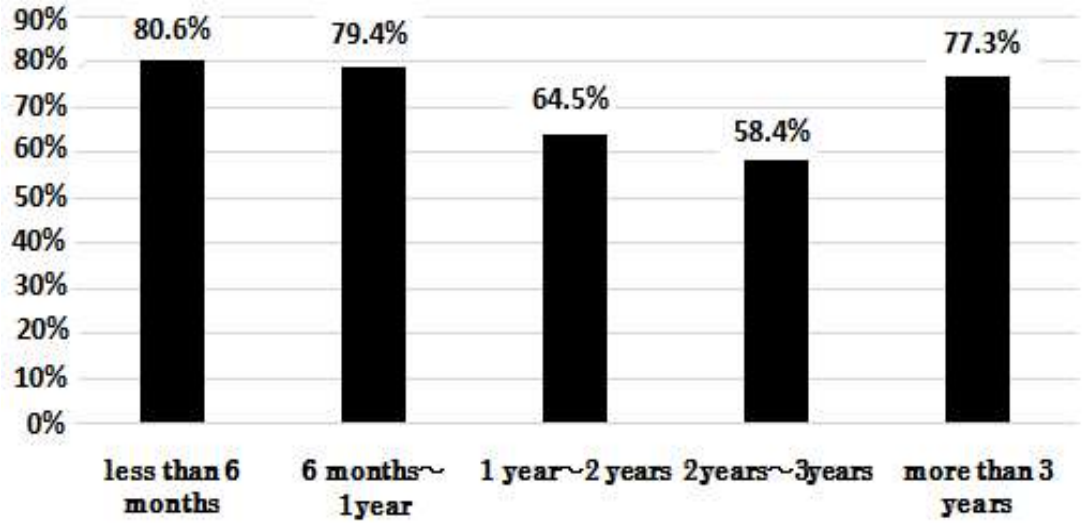

Table 16
Wish for Study Abroad in the Chinese Speaking World ($\chi 2$=151.853, df=3, p<.001)

		Wish for Study Abroad		Total
		Yes	No	
Cambodia (trade value with China; 18.92%)	frequency	551	60	611
	% of country	90.2%	9.8%	100.0%
	% of total	22.8%	2.5%	25.3%
Thailand (trade value with China: 14.26%)	frequency	275	90	365
	% of country	75.3%	24.7%	100.0%
	% of total	11.4%	3.7%	15.1%
Indonesia (trade value with China: 16.08%)	frequency	623	206	829
	% of country	75.2%	24.8%	100.0%
	% of total	25.8%	8.5%	34.4%
Vietnam (trade value with China: 20.63%)	frequency	362	245	607
	% of country	59.6%	40.40%	100.0%
	% of total	15.0%	10.20%	25.2%
Total	frequency	1811	601	2412
	% of country	75.1%	24.9%	100.0%
	% of total	75.1%	24.9%	100.0%

Broadcasting Corporation (BBC), it would be convenient, but the BBC's survey does not cover all of the four investigated countries. Therefore, using each country's trade rate with China (the ratio of the trade value with China in each country's total amount of imports and exports) as a substitution, an inversion phenomenon can be found. That is, Vietnam, with the highest trade rate with China and being considered to enjoy fairly intimate relations, is the contrary ranked the lowest in terms of the ratio of students who wish to study in China. On the other hand, Vietnam, which has highest ratio of students who began Chinese language learning because they were persuaded by their parents, is lower. In ancient times, while obeying China as a tributary state, Vietnam used to adhere strongly to China's cultural influences including the Chinese higher civil service examination.

Moreover, an extraordinarily number of Vietnamese students were accepted by and went to China as foreign students during the Vietnam War (Cengjiu, 1984, p. 136). This is despite the fact that, at that time there existed problems between the two countries including the China-Vietnamese War (1979) and a dominium issue involving the Spratly Islands, etc. In such a love-and-hate relationship, it is not easy to interpret underlying motivations and disincentives toward studying abroad in China.

Of the four countries concerned, Thailand started to establish the Confucius Institute in 2006 and already has 12 locations. Cambodia established one in 2009, and Indonesia established 6 in 2010. These countries are quite positive to accept the Confucius Institute and established it quite early. On the other hand, Vietnam

was slow to move. The establishment of the Confucius Institute was discussed at the time Chinese Prime Minister Li Keqiqiang visited Vietnam in October 2013. It was decided to establish one at Hanoi university at last, but it took a while for its management to get off the ground. Although Vietnam is the top of the four nations in terms of the trade volume, it was considerably more careful about accepting Chinese language or the Chinese culture. It can be said that Vietnam's feelings toward China as the whole country appears to be mirrored in the results of students' wish to study abroad in China.

CONCLUSION

So far, the history of overseas Chinese and ethnic Chinese along with Chinese language education in four southeast Asian countries was overviewed, and then what kind of awareness students have toward Chinese language and Chinese language education after various episodes of oppression, followed by the subsequent repealing of the ban on using the Chinese language was analyzed. I would like to conclude by summarizing the points which became clear through the analysis.

First of all, the enthusiastic rise of Chinese language learning has been widely found not only among Chinese posterity but also among non-ethnic Chinese students in each of the four nations. Among them, the concern about the Chinese language and the strong consciousness of its usefulness was observed through the responses to the questionnaire questions. Those who mentioned its international nature and practicality as a reason for learning Chinese language accounted for 60 percent or more. In addition, 88.9 percent of all respondents are studying English in addition to the Chinese language in school.

Secondly, those who considered the study of the Chinese language "interesting" account for about 90 percent. There is almost no difference between Chinese posterity and non-Chinese posterity. On the other hand, with regard to the feeling of difficulty, non-Chinese posterity reported that the study of the Chinese language feels more "difficult." Those who feel the Chinese language learning to be "difficult" are 58.2 percent of Chinese posterity, and 65.7 percent of non-Chinese posterity as a whole, but in Thailand the ratio of those who feel it to be "difficult" accounts for 80.1 percent as a whole and recaches as high as 80.3 percent among Chinese posterity.

Thirdly, 57.3 percent answered in the affirmative, and 42.7 percent in the negative to the question "Is there any person daily using Chinese language in your home or among your relatives?" Within the Chinese posterity group, some respondents reported daily use of the Chinese language in three fourth of the respondents' families. In the case of Chinese posterity, frequent chances to encounter the Chinese language at home facilitated learning of the language. However, only in Vietnam is the situation reversed with 35.0 percent of respondents affirming, and 65.0 percent denying daily usage of the Chinese language at home.

Fourthly, analyzing the correlation between thinking that the study of the Chinese language is "interesting" and that it is "difficult" and then extending this analysis to include which aspect of the language (pronunciation, grammar, or writing) is felt to be "difficult" in the light of difference of country and difference of Chinese posterity and non-Chinese posterity, revealed a statistically significant difference with writing exemplifying a typical case. It seems possible to interpret the fact based upon the linguistic-proximity

or congeniality of between the Chinese language and each of the other languages.

Fifthly, about studying abroad in Chinese-speaking areas, 75.2 percent answered positively, and 24.8 percent answered negatively, that is, there are three times more students in favor. However, in the case of Vietnam, the result was 15 percent lower than the average. This is despite Vietnam having the highest level of trade with China of the four countries. Complicated emotions can be imagined in the background that has been developed in the long history. It is also apparent in the relative shortness of time in which the learning of the Chinese language has taken place there.

Acknowledgement

This work was supported by JSPS (Japan Society for the Promotion of Science) KAKENHI Gant Number JP18K02430.

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PENGARUH AKTIVITAS MENANYA BERBASIS MASALAH DENGAN METODE SAINTIFIK TERHADAP PROSES KOGNITIF SISWA

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Abstrak

Penelitian ini bertujuan untukmelihat pengaruh aktivitas pembelajaran menanya berbasis masalah dengan pendekatan saintifik terhadap kognitif siswa kelas IV sekolah dasar (SD). Penelitian ini merupakan penelitian quasi eksperimen dengan rancangan *posttest only control group design*. Populasi dalam penelitian ini adalah kelas IV SD di sekolah Rintisan Kurikulum 2013 di Kabupaten Buleleng Tahun Pelajaran 2016/2017. Total populasi berjumlah 353 orang yang terbagi menjadi 11 kelas di antaranya terdapat kelas pararel. Sampel diambil dengan menggunakan teknik simple random sampling menghasilkan 73 siswa yang kemudian terbagi menjadi dua kelas. Metode pengumpulan data yang digunakan adalah tes esai yang sudah divalidasi secara konten dan empirik. Sebelum data dianalisa menggunakan T-test, data juga diuji menggunakan uji normalitas distribusi data terhadap keseluruhan unit analisis, dan ujihomogenitas varian antarkelompok. Hasil penelitian menunjukkan adanya perbedaan yang signifikan dimensi proses kognitif antara kelompok siswa yang diberikan aktivitas pembelajaran menanya berbasis masalah. dalam pendekatan saintifik dengan kelompok siswa yang diberikan aktivitas pembelajaran konvensional. Dapat disimpulkan bahwa aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik dapat meningkatkan kognitif siswa IV SD.

Kata kunci: *dimensi proses kognitif, menanya, pembelajaran tematik berbasis masalah*

OPTIMIZATION OF DIMENSIONS OF COGNITIVE PROCESS IN THEMATIC LEARNING BASED ON PROBLEM

Abstract

This study aimed to find out the effect of problem-based learning activities using scientific approach on the students' cognitive skill. This research was a quasi-experimental study with a posttest only control group design. The population in this study was the fourth grade elementary school in the 2013 in Pilot Elementary School in Buleleng year 2016/2017. From 353 total population, the sample was taken using simple random sampling technique which resulted in 73 students who were then divided into two classes. The data collection method used was content and empirical validated essay test. Before the data were analyzed using the T-test, the data were also tested using the data distribution normality test for the entire unit of analysis, and the homogeneity test of the variance between groups. There were significant differences in the dimensions of cognitive processes between groups of students who were given problem-based questioning learning activities in a scientific approach and the groups of students who are given conventional learning activities. The results show that the problem-based learning activity of asking questions in a scientific approach is able to improve the cognitive of the fourth grade students.

Keywords: *cognitive process dimensions, questioning, and problem-based thematic learning*

PENDAHULUAN

Kurikulum 2013 merupakan inovasi pendidikan yang diharapkan mampu menjadi wadah pengembangan dan peningkatan kualitas pendidikan. Dalam Kurikulum 2013, proses pembelajaran berlangsung dengan memadukan penalaran induktif dengan penalaran deduktif yang dikenal dengan sebutan pendekatan saintifik. Pendekatan saintifik merupakan kegiatan pembelajaran yang meliputi kegiatan mengamati, bertanya, menalar dan mengumpulkan data serta mengkomunikasikan (Anjarsari, 2019; In'am & Hajar, 2017; Sutarto, Jaedun & Raharjo, 2017). Setiap kegiatan yang sesuai untuk pekerjaan ilmiah dapat dikatakan penalaran induktif, melihat kesimpulan umum dapat diperoleh dengan mendasarkan kepada hal tertentu yang diperoleh. Pendekatan saintifik memberikan pemahaman kepada peserta didik dalam mengenai memahami berbagai materi menggunakan pendekatan ilmiah bahwa informasi bisa berasal dari mana saja, kapan saja, tidak bergantung pada informasi searah dari guru (Ambarsari, 2016; Suryani, Renda, & Wibawa, 2019). Siswa diharapkan melalui pendekatan saintifik bisa menjadi lebih aktif karena keberadaannya menjadi pusat pembelajaran.

Permasalahan yang terjadi saat ini yaitu banyak siswa yang mendapatkan nilai karena guru lebih dominan menggunakan metode konvensional (Andriani, Suarjana, & Lestari, 2017; Pramana, Jampel, & Pudjawan, 2018; Wulandari, Sudatha, & Simamora, 2020). Model pembelajaran konvensional membuat siswa cenderung pasif dalam belajar sehingga berpengaruh pada hasil belajar siswa. Permasalahan ini juga ditemukan pada beberapa sekolah dasar. Berdasarkan hasil observasi ditemukan proses kognitif siswa khususnya kelas IV masih rendah. Rendahnya dimensi proses kognitif siswa tercermin dari hasil tes studi pendahuluan yang diberikan pada siswa yang dapat dilihat pada Tabel 1.

Tabel 1 menunjukkan bahwa enam SD Rintisan Kurikulum 2013 di Kabupaten Buleleng, nilai rata-rata dari hasil tes studi pendahuluan masih rendah. Selain itu, hasil wawancara dan observasi awal pada 7 Januari 2017 yang dilakukan di sekolah-sekolah Rintisan Kurikulum 2013 di SD Kabupaten Buleleng ditemukan masalah yang hampir sama yaitu masih rendahnya hasil belajar siswa disebabkan

Tabel 1
Hasil Tes Studi Pendahuluan

No	Nama Sekolah	Kelas	Rata-rata Kelas
1	SDN 1 Busungbiu	IV	44,67
2	SDN 6 Pejarakan	IV	61,8
3	SDN 4 Banyuasri	IV	60,0
4	SDN 4 Kaliuntu	IV	63,8
5	SDN 3 Banjar Jawa	IVA	62,06
		IVB	64,2
		IVC	71,6
6	SDN 4 Kampung Baru	IVA	52,56
		IVB	57,38
7	SD Lab Undiksha	IVA	67,27
		IVB	65,14

oleh beberapa factor. *Pertama*, ditemukan pada saat melaksanakan pembelajaran tematik dalam pendekatan saintifik tidak berjalan dengan efektif, guru seolah-olah masih terbayang mengajar dengan menggunakan kurikulum KTSP. *Kedua*, guru dalam mengajar masih didominasi dengan metode ceramah sehingga aktivitas pembelajaran dengan pendekatan saintifik belum terlihat jelas. *Ketiga*, kurangnya bantuan media pembelajaran dalam menyampaikan materi sehingga guru hanya berpatokan pada buku panduan yang telah disediakan. *Keempat*, guru kurang benar dalam menerapkan pendekatan saintifik. Ada beberapa komponen yang belum dilaksanakan secara optimal. Pendekatan saintifik yang biasa digunakan saat guru mengajar kurang efektif. Salah satu komponen dalam pendekatan saintifik yaitu menanya, guru tidak melaksanakan komponen tersebut dalam pembelajaran saintifik dengan benar. Seharusnya guru melaksanakan komponen menanya dalam pembelajaran dengan seoptimal mungkin.

Berdasarkan permasalahan tersebut, solusi yang ditawarkan untuk mengatasi permasalahan tersebut yaitu dengan menerapkan aktivitas pembelajaran menanya berbasis masalah. Pembelajaran berbasis masalah atau *Problem-based Learning* adalah pembelajaran yang dapat dikolaborasikan dengan pembelajaran saintifik. Pembelajaran dengan menggunakan pendekatan saintifik akan mampu meningkatkan aktivitas, kreativitas, dan motivasi belajar siswa (Astini, Nurhasanah, & Nupus, 2019; Widnyani, Dantes, & Tegeh, 2015). Dengan meningkatnya aktivitas, kreativitas, dan motivasi siswa akan berakibat pada meningkatnya hasil belajar siswa. Penelitian yang dilakukan oleh Putri, Swatra, dan Tegeh (2018) menemukan bahwa model pembelajaran *Problem-based Learning* dapat meningkatkan hasil belajar siswa. *Problem-based Learning* merupakan model pembelajaran yang memberikan permasalahan nyata kepada siswa sehingga siswa dapat berpikir kritis dalam memecahkan sebuah masalah (Astraman, Dibia, & Mahadewi, 2017; Nur, Pujiastuti, & Rahman, 2016; Primayanti, Suarjana, & Astawan, 2019).

Karakteristik model pembelajaran *Problem Based Learning* yaitu *student-cented* yang lebih menitikberatkan kepada siswa sebagai orang yang belajar (Lukitasari, Purnamasari, Utami, & Sukri, 2019; Nur *et al*., 2016; Birgili, 2015). Siswa diharapkan secara aktif menggali pengetahuan sendiri lewat masalah yang diberikan dalam pembelajaran. Guru hendaknya merencanakan pembelajaran yang menuntut siswa banyak melakukan aktivitas belajar sendiri atau mandiri agar siswa berperan sebagai pelaku kegiatan belajar. Kognitif siswa diharapkan dapat meningkat melalui pendekatan saintifik.

Penelitian ini bertujuan untuk melihat pengaruh aktivitas pembelajaran menanya berbasis masalah dengan pendekatan saintifik terhadap kognitif siswa kelas IV SD. Peningkatan aspek kognitif dapat mendorong keaktifan siswa dalam belajar.

METODE

Penelitian ini merupakan penelitian quasi eksperimen dengan rancangan *posttest only control group design*. Populasi dalam penelitian ini adalah kelas IV SD di sekolah Rintisan Kurikulum 2013 di Kabupaten Buleleng Tahun Pelajaran 2016/2017. Total populasi berjumlah 353 orang yang terbagi menjadi 11 kelas di antaranya terdapat kelas pararel. Sampel diambil dengan menggunakan teknik *simple random sampling* dengan cara undian yang berjumlah 73 orang terbagi menjadi dua kelas.

Metode pengumpulan data yang digunakan adalah tes esai yang berjumlah 19 butir soal yang sudah divalidasi secara konten dan empirik. Secara konten, tes yang digunakan sudah memenuhi unsur kompetensi dasar dengan kalimat yang baik sesuai dengan perkembangan psikologis anak usia kelas IV Sekolah Dasar. Sedangkan analisis validasi empirik yang ditinjau dari analisis konsistensi internal tes terhadap 24 butir tes, dan 5 butir tes yang diujikan dinyatakan tidak valid dan 19 butir tes yang diujikan dinyatakan valid. Analisis daya beda butir tes didapatkan 14 butir yang berkualifikasi cukup baik dan 5 butir berkualifikasi kurang baik. Analisis tingkat kesukaran tes didapatkan 14 butir tes berada pada kriteria sedang, dan 5 butir tes berada pada kriteria mudah. Analisis reliabilitas tes dinyatakan bahwa reliabilitas tes berada pada kualifikasi tinggi (0,76). Data pembelajaran tematik dimensi proses kognitif tema 8 subtema 1 dan subtema 2 siswa diambil dengan memberikan *posttest* pada siswa setelah selesai menerapkan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik dan menerapkan aktivitas pembelajaran konvensional. Data dianalisis dengan menggunakan uji-*t*.

HASIL PENELITIAN DAN PEMBAHASAN

Penelitian ini menemukan bahwa pada kelompok eksperimen dimensi proses kognitif siswa setelah mengikuti pembelajaran pendekatan saintifik dalam proses menanya berbasis masalah sebanyak 41,55% siswa mendapatkan nilai dengan kategori tinggi dan sangat tinggi; 16,67% siswa mendapatkan nilai dengan kategori sedang dan 21,41% siswa mendapatkan nilai dengan kategori rendah dan sangat rendah. Hasil berbeda didapatkan pada kelompok control. Pada kelompok kontrol dimensi proses kognitif siswa setelah mengikuti pembelajaran konvensional sebanyak 21,41% siswa mendapatkan nilai dengan kategori sangat tinggi dan tinggi, serta 78,39% siswa mendapatkan nilai dengan kategori sedang. Penelitian ini menunjukkan bahwa pada kelompok eksperimen data dimensi proses kognitif siswa cenderung berada pada kategori sedang ke atas, sedangkan pada kelompok kontrol cenderung berada pada kelompok sedang ke bawah. Hasil *posttest* terhadap 36 orang siswa pada kelompok eksperimen dan terhadap 37 orang siswa kelompok kontrol ditunjukkan pada Tabel 2.

Berdasarkan kriteria skala lima dan sesuai dengan hasil analisis data bahwa *mean* dimensi proses kognitif tema 8 (tempat tinggalku) subtema 1 dan subtema 2 pada kelompok yang dibelajarkan dengan menggunakan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik adalah 55,22 (berada pada kategori sangat tinggi). Sebaliknya,

Tabel 2
Hasil Posttest Siswa Kelompok Eksperimen dan Kontrol

Rentang Skor Real	Kelompok Eksperimen	Kelompok Kontrol	Kategori
$57{,}05 \leq X \leq 76{,}1$	4 (11,11%)	4 (5,41%)	Sangat Tinggi
$44{,}35 \leq X < 57{,}05$	7 (19,44%)	11 (16%)	Tinggi
$31{,}65 \leq X < 44{,}35$	4 (11,11%)	6 (21,6%)	Sedang
$18{,}95 \leq X < 31{,}65$	6 (16,67%)	8 (16,22%)	Rendah
$0{,}1 \leq X < 18{,}95$	10 (28%)	6 (29,73%)	Sangat Rendah

mean dimensi proses kognitif tema 8 (tempat tinggalku) subtema 1 dan subtema 2 pada kelompok yang dibelajarkan dengan menggunakan aktivitas pembelajaran konvensional adalah 41,16 (berada pada kategori sedang). Hal ini berarti bahwa rata-rata dimensi proses kognitif tema 8 (tempat tinggalku) subtema 1 dan subtema 2 siswa kelompok eksperimen lebih tinggi daripada nilai rata-rata dimensi proses kognitif tema 8 (tempat tinggalku) subtema 1 dan subtema 2 siswa kelompok kontrol. Data rata-rata dan standar deviasi hasil *posttest* kedua kelompok adalah sebagai berikut. Kelompok eksperimen rerata 59,22 dan standar deviasi 10,49. Kelompok kontrol rerata 41,16 dan standar deviasi 8,08.

Sebelum dilakukan pengujian hipotesis dengan uji-t independent terlebih dahulu dilakukan pengujian terhadap prasyarat yang diperlukan terhadap sebaran data hasil penelitian. Uji prasyarat analisis meliputi dua hal, yaitu uji normalitas distribusi data terhadap keseluruhan unit analisis, dan uji homogenitas varian antarkelompok.

Uji normalitas data dilakukan pada keseluruhan unit analisis yaitu kelompok eksperimen dan kelompok kontrol. Analisis yang digunakan pada pengujian normalitas sebaran data adalah analisis *Chi-Kuadrat*. Proses analisis dibantu dengan menggunakan program *MicrosoftExcel* 2007 *for Windows*. Ketentuan normalitas data ditentukan dengan melihat signifikansi hasil analisis. Data berdistribusi normal jika angka signifikansi yang diperoleh lebih dari 0,05 pada taraf signifikansi 5%. Ringkasan hasil uji normalitas data pada kelompok eksperimen dan kelompok kontrol disajikan pada Tabel 3.

Tabel 3 menunjukkan bahwa nilai signifikansi berada di atas 0,05 untuk semua unit analisis baik menggunakan uji *chi-kuadrat*. Artinya, bahwa sebaran data pada kelompok eksperimen berdistribusi normal. Hasil yang hampir sama juga diperoleh pada data kelompok kontrol. Terungkap bahwa nilai signifikansi berada di atas 0,05 untuk semua unit analisis baik menggunakan uji *chi-kuadrat*. Hal ini menunjukkan bahwa sebaran data pada kelompok kontrol juga berdistribusi normal.

Uji homogenitas varians dilakukan berdasarkan data dimensi proses kognitif pada kelompok eksperimen dan kelompok kontrol. Jumlah masing-masing unit analisis adalah 36 dan 37 orang siswa. Uji homogenitas varians antarkelompok menggunakan uji F. Data dinyatakan homogen jika $F_{hitung} < F_{tabel}$. Ringkasan hasil uji homogenitas varians antara kelompok disajikan dalam Tabel 4.

Tabel 4 menunjukkan bahwa ringkasan data hasil uji homogenitas varians untuk kedua kelompok model pembelajaran menunjukkan bahwa $F_{hitung} < F_{tabel}$ yang dibantu dengan program *MicrosoftExcel* 2007 *for Windows*. Ini berarti bahwa varians antara kelompok siswa homogen.

Hipotesis penelitian yang diuji adalah terdapat perbedaan yang signifikan dimensi proses kognitif antara kelompok siswa yang diberikan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik

Tabel 3
Ringkasan Hasil Uji Normalitas Distribusi Data

Model Pembelajaran	*Chi-Kuadrat*		
	T_{tabel}	N	T_{hitung}
Kelompok eksperimen	7,815	36	6,768
Kelompok kontrol	7,815	37	3,766

Tabel 4
Ringkasan Hasil Uji Homogenitas Varians

Sampel	*Mean*	SD	*Varians*	F_{hitung}	F_{tabel}	Kesimpulan
Kelompok eksperimen	59,22	10,49	110,12	1,68	1,74	$F_{hitung} < F_{tabel}$
Kelompok Kontrol	41,16	8,08	65,36			

dengan kelompok siswa yang diberikan aktivitas pembelajaran konvensional pada kelas IV SD di Kabupaten Buleleng Tahun Pelajaran 2016/2017. Untuk menguji hipotesis digunakan uji-t tidak berkorelasi atau *t-test independent*. Tabel 4 menunjukkan bahwa varian homogen dan jumlah siswa pada tiap kelas yang sama maka pada uji-t tidak berkorelasi ini digunakan rumus *polled varians.* Ringkasan hasil uji-t tidak berkorelasi disajikan pada Tabel 5.

Berdasarkan hipotesis penelitian yang telah diajukan pada kajian teori kriteria pengujian H_0 ditolak jika $t_{hitung} > t_{tabel}$ dan H_1 diterima dengan taraf signifikansi 5% dan didukung oleh perbedaan skor rata-rata yang diperoleh antara kelompok eksperimen yaitu 59,22 yang berada pada kategori sangat tinggi dan kelompok kontrol yaitu 41,16 yang berada pada kategori sedang (cukup tinggi) maka hipotesis alternatif diterima. Ringkasan data hasil uji hipotesis menunjukan hal yang sama bahwa $t_{hitung} > t_{tabel}$ sehingga H_0 ditolak dan H_1 diterima. Dengan demikian, dapat diinterpretasikan bahwa terdapat perbedaan yang signifikan dimensi proses kognitif antara kelompok siswa yang diberikan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik dengan kelompok siswa yang diberikan aktivitas pembelajaran konvensional pada kelas IV SD di Kabupaten Buleleng Tahun Pelajaran 2016/2017.

Berdasarkan nilai rata-rata dimensi proses kognitif tema 8 (tempat tinggal-ku) subtema 1 dan subtema 2 pada kelompok siswa yang diberikan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik adalah 59,22 lebih tinggi daripada kelompok siswa yang diberikan aktivitas pembelajaran konvensional yang nilai rata-rata siswa adalah 41,16. Artinya, bahwa aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik berpengaruh positif terhadap dimensi proses kognitif tema 8 subtema 1 dan subtema 2 siswa kelas IV di Kabupaten Buleleng tahun pelajaran 2016/2017.

Hasil penelitian ini menunjukkan bahwa pada kelompok siswa yang diberikan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik bahwa pada kelompok eksperimen sebanyak 41,55% siswa mendapatkan nilai dengan kategori tinggi dan sangat tinggi; 16,67% siswa mendapatkan nilai dengan kategori sedang; 21,41% siswa mendapatkan nilai

Tabel 5
Ringkasan Data Hasil Uji Hipotesis

Kelompok	Varian	N	Db	t_{hitung}	t_{tabel}	Kesimpulan
Kelompok eksperimen	10,49	36	71	8,251	2,000	$t_{hitung} > t_{tabel}$ H_1 diterima
Kelompok Kontrol	8,08	37				

dengan kategori rendah dan sangat rendah. Aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik dapat meningkatkan hasil belajar siswa hal ini disebabkan oleh beberapa faktor.

Pertama, aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik dapat meningkatkan hasil belajar karena dapat membuat suasana belajar yang menyenangkan bagi siswa. Aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik yang diberikan oleh guru memberikan kenyaman dan ketenangan dalam proses pembelajaran sehingga proses belajar mengajar menjadi kondusif (Ambarsari, 2016; Paut, 2016). Aktivitas pembelajaran yang nyaman akan berdampak pada motivasi siswa dalam belajar yang meningkatkan. Penelitian yang dilakukan oleh Arianti (2017) menyatakan bahwa suasana belajar yang menyenangkan akan meningkatkan kemamupaun siswa dalam menerima materi yang sadang dibelajarkan. Sedangkan penelitian Widodo (2016) menyatakan pembelajaran bermakna dapat diciptakan dengan suasana belajar yang menyenagkan. Pendekatan scientifik dengan Pembelajaran Berbasis Masalah (PBL) membantu siswa menemukan sendiri suatu solusi. PBL melatih siswa untuk memiliki rasa ingin tahu yang tinggi dalam pembelajaran (Nur *et al*., 2016). Proses pembelajaran pada kelompok siswa yang dibelajarkan dengan memberikan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik terlihat lebih aktif, menyenangkan, dan termotivasi untuk belajar.

Kedua, aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik dapat meningkatkan hasil belajar karena dapat meningkatkan keaktif-an siswa dalam belajar. pembelajaran harus diarahkan agar dapat membangkitkan kreativitas siswa dengan cara belajar berkelompok. Dengan cara berkelompok, siswa dapat berdiskusi satu sama lain, bertukar informasi, dan siswa yang pintar dapat membantu yang kurang pintar (Jahro & Ridho, 2015; Rosnaeni, Muslimin, & Saehana, 2018). Pendekatan saintifik merupakan proses pembelajaran yang dirancang sedemikian rupa agar peserta didik secara aktif mengonstruk konsep, hukum atau prinsip melalui tahapan-tahapan mengamati (untuk mengidentifikasi atau menemukan masalah), merumuskan masalah, mengajukan atau merumuskan hipotesis, mengumpulkan data dengan berbagai teknik, menganalisis data, menarik kesimpulan dan mengomunikasikan konsep, hukum atau prinsip yang ditemukan (Ambarsari, 2016; Sutarto dkk., 2017; Suryani dkk., 2019).

Hasil penelitian ini juga diperkuat oleh Atmojo (2012, p.7) yang mengatakan bahwa dengan model PBM membuat siswa menjadi jelas dan semakin paham dengan pembelajaran yang dilakukan. Pembelajaran dengan eksplorasi lingkungan yang digunakan merupakan pengalaman keseharian siswa sehingga dapat meletakkan dasar-dasar yang nyata bagi siswa untuk berpikir. Masalah-masalah yang disajikan dalam pembelajaran adalah masalah nyata yang dialami dalam kehidupan sehari-hari karena mereka dapat belajar memecahkan masalah yang terjadi di masyarakat sehingga suatu saat ilmu yang dipelajari dapat diterapkan langsung dalam masyarakat. Pada penelitian ini, dalam proses pembelajaran berlangsung guru bertugas sebagai fasilitator dan motivator. Semua indikator pada aspek pembelajaran berpusat pada siswa semuanya yang terlihat pada setiap pembelajaran.

Selama proses pembelajaran berlangsung semua siswa terlibat dan dituntut berpartisipasi aktif. Penelitian yang dilakukan oleh Kimianti dan Prasetyo (2019) juga menyatakan model

pembelajaran *Problem-based Learning* memungkinkan bagi peserta didik untuk aktif dan berani mengajukan solusi dari masalah yang sedang dihadapi. Dalam pembelajaran dengan pendekatan saintifik, inovasi aktivitas pembelajaran berbasis masalah akan diterapkan pada langkah menanya. Anjarsari (2019) menyatakan bahwa pendekatan saintifik adalah proses pembelajaran yang dirancang sedemikian rupa agar peserta didik secara aktif mengkonstruksi konsep, hukum atau prinsip melalui tahap mengamati, mengumpulkan data hingga menarik suatu kesimpulannya yang kemudian dikomunikasikan.

Hasil penelitian yang dilakukan di kelas eksperimen ditemukan beberapa hal. Kelebihan saat menerapkan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifk ialah siswa menjadi lebih aktif dalam bertanya dan berinteraksi dengan teman sekitarnya. Biasanya siswa yang memiliki intelektual tinggi cenderung berkumpul dalam satu kelompok sedangkan siswa yang memiliki intelektual rendah cenderung berkumpul dalam satu kelompok. Diperkuat oleh hasil penelitian Mulyani (2013) yang menemukan bahwa pembelajaran pendekatan saintifik dengan PBL membuat siswa lebih terlibat aktif dalam pembelajaran, terutama dalam kegiatan eksperimen. Siswa dapat belajar secara langsung menggunakan benda-benda konkret yang dekat dengan siswa dalam kehidupan sehari-hari.

SIMPULAN

Terdapat perbedaan yang signifikan dimensi proses kognitif antara kelompok siswa yang diberikan aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifikdengan kelompok siswa yang diberikan aktivitas pembelajaran konvensional pada kelas IV SD di Kabupaten Buleleng Tahun Pelajaran 2016/2017. Dapat disimpulkan bahwa aktivitas pembelajaran menanya berbasis masalah dalam pendekatan saintifik dapat meningkatkan kognitif siswa IV SD.

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IMPLEMENTASI DELAPAN METODE KEPRAMUKAAN SEBAGAI BENTUK PENGUATAN PENDIDIKAN KARAKTER SISWA SEKOLAH DASAR

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Abstrak

Tujuan penelitian ini adalah untuk mendeskripsikan implementasi 8 metode kepramukaan sebagai penguatan pendidikan karakter siswa sekolah dasar di Kecamatan Selong. Penelitian ini merupakan penelitian deskriptif kualitatif. Subjek dalam penelitian ini berjumlah 54 orang sebagai data primer, terdiri dari 3 orang kepala sekolah, 6 orang pembina putra dan putri, 45 orang siswa atau anggota pramuka penggalang SD. Data diperoleh melalui hasil wawancara, observasi, dan dokumentasi. Data dianalisis dengan menerapkan teknik analisis interaktif Miles dan Huberman. Kebenaran dan keabsahan data ditetapkan melalui teknik triangulasi sumber, metode, dan waktu. Hasil penelitian membuktikan bahwa implementasi delapan metode kepramukaan terdiri dari: mengamalkan kode kehormatan pramuka, memberikan bimbingan dan motivasi dari pembina, menyelenggarakan kegiatan secara berkelompok, menyelenggarakan kegiatan yang menarik dan menantang, melakukan aktivitas sambil belajar, menyelenggarakan kegiatan di alam terbuka, menerapkan sistem satuan terpisah, dan memberikan penghargaan tanda kecakapan. Pelaksanaan metode kepramukaan berpotensi sebagai sarana untuk menguatkan karakter siswa sekolah dasar.

Kata kunci: *metode kepramukaan, pendidikan karakter, siswa sekolah dasar*

THE IMPLEMENTATION OFEIGHT SCOUTING METHODS IN REINFORCING ELEMENTARY STUDENTS' CHARACTER

Abstract

This study was aimed at describing the implementation of 8 scouting methods as strengthening character education for elementary school students in Selong. This research was a qualitative descriptive study. The subjects were 54 people as primary data, consisting of 3 school principals, 6 male and female coaches, 45 students or members of elementary school scouts. The data were obtained through interviews, observation, and documentation. Then they were analyzed by applying the interactive analysis technique of Miles and Huberman. The correctness and validity of the data were determined through the triangulation technique of sources, methods, and time. The results show that the implementation of the eight scouting methods consists of: practicing the scouting honor code, providing guidance and motivation from the coach, organizing activities in groups, organizing interesting and challenging activities, carrying out activities while learning, holding activities in the open, implementing a separate unit system. , and giving awards a mark of proficiency. The implementation of the scouting method has the potential as a means of strengthening the character of elementary school students.

Keywords: *scouting methods, character education, elementary students*

PENDAHULUAN

Pendidikan karakter sebagai salah satu visi pendidikan di Indonesia. Siswa tidak hanya dibekali ilmu pengetahuan, akan tetapi pengetahuan itu dapat diaktualisasikan ke dalam kehidupan sehari-hari. Bahkan penguatan pendidikan karakter di sekolah dasar menjadi prioritas utama dan mendapatkan porsi yang lebih banyak dibandingkan pengajaran pengetahuan. Karena gerakan terhadap penguatan karakter siswa menjadi bagian dari pondasi utama pendidikan. Hal ini tertuang dalam tujuan pendidikan nasional, yaitu:untuk mengembangkan potensi peserta didik, beriman dan bertakwa terhadap Tuhan Yang Maha Esa, membentuk karakter, berwawasan luas, kreatif, sehat, mandiri, demokratis, dan bertanggung jawab (Isdaryanti, Rachman, Sukestiyarno, Florentinus, & Widodo, 2018).

Pendidikan karakter menjadi salah satu isu yang hangat diperbincangkan, ketika diberlakukan pendidikan karakter secara nasional, khususnya pendidikan tingkat sekolah dasar (Aeni, 2014). Pada tingkat pendidikan awal, siswa harus dibekali dengan pengatuhan tentang nilai-nilai yang baik untuk membentuk karakter anak sejak dini. Upayadalam mengembangkan manusia seutuhnya melalui pendidikan. Kualitas kemanusiaan yang berkaitan dengan perilaku merupakan hasil dari proses belajar (Suratmi & Munhaji, 2015). Dewasa ini pendidikan karakter sangat diperlukan oleh generasi muda, karena maraknya fenomena sosial terutama pada penyimpangan-penyimpangan moral, etika, sistem nilai sosial, dan budaya bangsa (Afandi, 2011). Oleh karena itu, lulusan pendidikan diharapkan dapat membentuk karakter siswa (*character building*), sehingga mereka dapat ikut serta dalam pembangunan nasional di masa depan, namun tetap berlandaskan pada nilai-nilai moral atau akhlak yang baik (Marzuki & Hapsari, 2015).

Pendidikan karakter dalam istilah lain dapat diartikan sebagai pendidikan moral, pendidikan budi pekerti, pendidikan nilai, dan pendidikan watak yang bertujuan untuk mengamalkan kebaikan dalam kehidupan sehari-hari (Cahyo, 2017). Implementasi pendidikan karakter di sekolah bertujuan untuk mengembangkan kemampuan siswa dalam memilih sesuatu yang baik, dijaga dan diaplikasikan dalam kehidupan mereka, serta dilakukan secara sadar dan berkelanjutan. Karena pendidikan sebagai sarana untuk mempromosikan perilaku dan sikap yang baik, menjaga nilai-nilai kebangsaan, menghargai keragaman dan perbedaan, serta kecenderungan untuk menghadapi dunia yang semakin kompetitif (Qoyyimah, 2016).

Sebagai tripusat pendidikan, lingkungan keluarga, sekolah, dan masyarakat sangat membantu proses pendidikan karakter, dengan cara mendukung satu sama lain sehingga menjadi kesatuan yang utuh. Implementasi pendidikan karakter menjadi tanggung jawab bersama dalam mencapai tujuan pendidikan, namun beban lingkungan sekolah lebih besar dalam menginternalisasikan pikiran (Wijayanti, 2018). Pembiasaan di sekolah melalui kegiatan yang positif sangat membantu anak, terutama melalui kegiatan-kegiatan ekstrakurikuler yang diorientasikan untuk membentuk perilaku, sikap, dan kepribadian anak (Yatmiko, Banowati, & Suhandini, 2015).

Kegiatan-kegiatan positif tersebut dapat diaplikasikan melalui kegiatan intra-kurikuler, kokurikuler, dan ekstrakurikuler dengan membangun kolaborasi dari tri-pusat pendidikan. Selain itu, penguatan pendidikan karakter siswa di sekolah dapat dilakukan melalui tiga cara, yakni: pendidikan karakter yang terintegrasi

dengan semua mata pelajaran sehingga aktivitas belajar dan mengajar sebagai pendukung penguatan pendidikan karakter; pendidikan karakter melalui kegiatan ekstrakurikuler dan intrakurikuler; dan pendidikan karakter yang dilaksanakan melalui program sekolah yang melibatkan warga sekolah (Dit. PSMP Kemdiknas, 2010).

Hasil penelitian Sukoyo (2017) menemukan bahwa perbedaan karakter siswa setelah diberikan pembelajaran menggunakan media lagu-lagu berbahasa Jawa menunjukkan hasil yang lebih positif dalam pembiasaan karakter disiplin, mandiri, kerja keras, religius, dan peduli lingkungan. Nilai karakter yang sering mengalami peningkatan merupakan nilai karakter peduli terhadap lingkungan. Hal ini didorong karena guru sebagai *role model* dalam membiasakan anak di sekolah untuk selalu peduli terhadap lingkungan sejak awal anak masuk PAUD. Wulandari, Wijayanti, dan Saliman. (2019) menjelaskan bahwa untuk mengembangkan nilai karakter anak melalui *knowing* (pengetahuan), *acting* (melakukan), dan menjadi *habit* (kebiasaan), karakter bukan hanya sekedar pengetahuan, akan tetapi tercermin dalam tindakan nyata secara berkesinambungan baik dalam lingkungan keluarga, sekolah maupun masyarakat.

Penguatan pendidikan karakter dalam lingkungan sekolah merupakan tanggung jawab bersama dengan melaksanakan ketegasan terkait dengan aturan sekolah dalam membentuk karakter warga sekolah terutama siswa (Agustina, 2018). Budaya sekolah yang disiplin, kerjasama, tanggung jawab dan saling menghormati mengakibatkan suasana yang kondusif untuk meningkatkan kenyamanan dan semangat bekerja. Selain itu, pembentukan karakter kepada siswa dapat memberikan pengaruh yang positif terhadap prestasi belajar mereka, terutama nilai karakter disiplin memberikan sumbangsih yang paling besar (Irjanti & Setiawati, 2018).

Berdasarkan data dari Komisi Perlindungan Anak Indonesia pada semester pertama tahun 2018 telah menangani sebanyak 1.885 kasus, dan kasus Anak Berhadapan Hukum (ABH) terdapat ada 504 kasus di antaranya: pelaku mencuri sebanyak 23,9%; narkoba sebanyak 17,8%; dan asusila sebanyak 13,2% (detik.com, 2018). Ada beberapa faktor yang menyebabkan dekadensi moral ini terjadi terhadap anak yakni: pengaruh teknologi informasi, filter informasi yang kurang, pergaulan bebas, lemahnya pengawasan orang tua, dan lemahnya pengawasan dari lembaga pendidikan (Cahyo, 2017). Pendidikan sebagai alternatif yang bersifat preventif untuk mengatasi masalah budaya dan karakter bangsa yang banyak dikemukakan (Ambarini, 2017).

Dukungan dari pemerintah daerah Kabupaten Lombok Timur terhadap program penguatan pendidikan karakter telah dilaksanakan sejak tahun 2017. Akan tetapi, penyelenggaraan program pendidikan di sekolah tidak berbanding lurus dengan yang diharapkan oleh pemerintah daerah. Artinya, terdapat diskomunikasi dalam menyusun dan melaksanakan program penguatan pendidikan karakter yang lebih baik. Di sisi lain, guru merasa dibebankan dengan banyaknya administrasi yang harus dikerjakan, sehingga mengesampingkan peran utama seorang guru untuk memberikan ilmu pengetahuan dan membentuk karakter siswa. Akibatnya, pendidikan karakter masih bersifat administratif dan tidak dapat diinternalisasi serta diaktualisasikan oleh siswa dalam kehidupan sehari-hari.

Persoalan lain yang dihadapi oleh guru adalah kurangnya kemampuan untuk mendesain pembelajaran yang menarik agar tujuan pembelajaran dapat tercapai

dengan optimal. Minimnya keterlibatan semua pihak dalam penyelenggaraan penguatan pendidikan karakter yang menghambat proses pembentukan karakter siswa. Karena penguatan pendidikan karakter hanya dilaksanakan di lingkungan sekolah dan tidak dilakukan secara berkelanjutan (*sustainable*) di lingkungan keluarga maupun masyarakat. Semua aspek pendidikan diharapkan sebagai ladang untuk aktivitas atau kegiatan mendidik yang dilakukan melalui metode menarik dan menantang menjadi salah satu alternatif dalam mengasah potensi siswa dan mengatasi masalah-masalah dekadensi moral generasi muda.

Kegiatan ekstrakurikuler sebagai sarana yang tepat dalam penguatan karakter siswa di sekolah. Hasil penelitian Marzuki dan Hapsari (2015) menemukan bahwa kegiatan kepramukaan di MAN 1 Yogyakarta dapat membentuk karakter siswa melalui peran pembina dan dukungan fasilitas dengan kegiatan yang modern, menarik, dan menantang. Metode kepramukaan antara lain: pengamalan kode kehormatan pramuka, berkelompok, berkerja sama dan berkompetisi, dilakukan di tempat alam terbuka, penghargaan, belajar sambil melakukan, dan satuan terpisah. Kegiatan kepramukaan sebagai sarana yang baik dalam membentuk karakter tanggung jawab siswa di SMP Negeri 2 Windusari Magelang (Woro & Marzuki, 2016). Hal ini dilakukan melalui pemberian nasihat, sanksi, keteladanan, pemberian penghargaan, dan pencapaian SKU dan SKK. Dukungan dari pembina, pihak sekolah, dan orang tua sebagai faktor pendukung pembentukan karakter tanggung jawab siswa.

Beberapa hasil penelitian di atas menggambarkan ekstrakurikuler pramuka dapat dijadikan sebagai kegiatan pendukung kegiatan akademik siswa, terutama dalam penguatan karakternya. Keberhasilan dalam penguatan pendidikan karakter siswa dibutuhkan proses atau kegiatan yang positif dan dilakukan secara kontinyu untuk memberikan efek yang optimal (Solihati, Hikmat, Rahman, & Hidayatullah, 2019). Oleh karena itu, kegiatan ekstrakurikuler pramuka dilaksanakan dengan cara terintegrasi antara pembelajaran di sekolah dengan metode yang kreatif, inovatif, dan menyenangkan. Penelitian ini berupaya untuk menemukan dan mendeskripsikan implementasi delapan metode kepramukaan sebagai bentuk penguatan pendidikan karakter siswa sekolah dasar.

METODE

Penelitian ini menggunakan pendekatan kualitiatif. Lokasi penelitian dilaksanakan di SDN 3 Pancor, MI Hamzanwadi 1 Pancor, dan SDN 2 Selong yang berada di Kecamatan Selong, Kabupaten Lombok Timur. Penentuan tiga sekolah tersebut didasarkan pada keaktifan ekstrakurikuler pramuka di satuan pendidikan di Kecamatan Selong. Subjek dalam penelitian ini berjumlah 54 orang sebagai data primer, terdiri atas 3 orang kepala sekolah, 6 orang pembina putra dan putri, 45 orang siswa atau anggota pramuka penggalang SD. Sedangkan hasil penelitian terdahulu dan dokumen pendukung lainnya dijadikan sebagai sumber data sekunder. Penentuan subjek penelitian dengan menetapkan kriteria khusus untuk mengumpulkan informasi sesuai dengan tujuan penelitian.

Data diperoleh menggunakan teknik wawancara dengan kepala sekolah, guru, pembina, dan siswa; observasi kondisi sekolah dan kegiatan kepramukaan; dan dokumentasi mengenai data sekolah, program ekstrakurikuler pramuka, serta prestasi dan jumlah anggota pramuka. Kebenaran dan keabsahan data ditetapkan

melalui teknik triangulasi sumber, metode, dan waktu. Hal ini dilakukan untuk membandingkan dan membuktikan kebenaran data yang didapatkan dengan cara pengecekan (*recheck).*

Data dianalisis dengan menerapkan model interaktif (*interactive model*) yang mengikuti format dari Miles dan Huberman (1992) yang meliputi tiga tahapan yaitu: reduksi data, penyajian data, dan penarikan kesimpulan. Tiga tahapan tersebut diawali dengan reduksi data untuk mem-*filter* dan menyederhanakan data yang diperoleh melalui teknik wawancara dan observasi; penyajian data (*display data)* dalam bentuk deskripsi tentang hasil wawancara, observasi, dan dokumentasi implementasi metode kepramukaan sebagai bentuk penguatan pendidikan karakter siswa sekolah dasar; dan pada tahap akhir penarikan kesimpulan berdasarkan sumber data di lapangan yang diperoleh dari data primer dan sekunder.

HASIL PENELITIAN DAN PEMBAHASAN

Berdasarkan Undang-undang Nomor 12 Tahun 2010 tentang Gerakan Pramuka dan Permendikbud RI Nomor 63 Tahun 2014 tentang Pendidikan Kepramukaan, dinyatakan kegiatan ekstrakurikuler pramuka menjadi wajib untuk anak di tingkat dasar dan menengah karena pendidikan kepramukaan sebagai sarana untuk membentuk kepribadian, keterampilan, dan akhlak mulia melalui kegiatan-kegiatan yang menarik dan menantang. Dalam penyelenggaraan kepramukaan harus disesuaikan dengan pedoman pelaksanaan berdasarkan keputusan dari Kwarnas Gerakan Pramuka Nomor 220 Tahun 2007. Namun, dalam penyelenggaraan dikembangkan dan disesuaikan dengan kebutuhan dari gugus depan masing-masing.

Pembina pramuka di SDN 3 Pancor terdapat satu orang pembina gugus depan, dua orang pembina satuan, dan dua orang pembantu pembina. Di MI Hamzanwadi 1 Pancor memiliki satu orang pembina gugus depan, dua orang pembina satuan, dan empat orang pembantu pembina. Di SDN 2 Selong terdapat satu orang pembina gugus depan, dan dua orang pembina satuan. Keterlibatan langsung dari pembina dalam setiap kegiatan sangat penting untuk mencapai tujuan terselenggaranya kegiatan kepramukaan dapat terwujud. Kemudian gugus depan merupakan suatu kesatuan organik yang memiliki tujuan untuk menghimpun anggota pramuka dan sebagai pangkalan untuk dapat berkomunikasi, edukasi, dan berkolaborasi dengan anggota muda.

Pendataan nomor gugus depan dalam satu pangkalan ditentukan oleh Kwartir Cabang Lombok Timur. Berdasarkan pendataan tersebut ditetapkan nomor gugus depan untuk SDN 3 Pancor yaitu 13.017-13.018, MI Hamzanwadi 1 Pancor yaitu 13.123-13.124, dan SDN 2 Selong yaitu 13.003-13.004. Anggota pramuka di sekolah dasar terbagi menjadi dua golongan berdasarkan umur dan pencapaiannya, yaitu anggota pramuka golongan siaga dan golongan penggalang. Pada Tahun Ajaran 2018-2019 di SDN 3 Pancor terdaftar sejumlah 92 anggota, terdiri atas 42 orang anggota golongan siaga dan 50 orang anggota golongan penggalang. Di MI Hamzanwadi 1 Pancor terdaftar sejumlah 73 anggota, terdiri atas 32 orang anggota golongan siaga dan 41 orang anggota golongan penggalang. Di SDN 2 Selong terdaftar sejumlah 60 orang anggota, terdiri atas 25 anggota golongan siaga dan 35 orang anggota golongan penggalang.

Penyelenggaraan ekstrakurikuler pramuka di SDN 3 Pancor, MI Hamzanwadi 1 Pancor, dan SDN 2 Selong sudah dilaksanakan dengan baik. Hal ini dibuktikan dengan prestasi yang telah didapatkan,

baik dalam lomba tingkat kwartir ranting, cabang, maupun daerah. Prestasi yang diperoleh karena kerja keras dari semua yang terlibat dalam penyelanggaraan pramuka, mulai dari peran kwartir cabang Lombok Timur, majelis pembimbing gugus depan, pembina putra dan putri, sampai pada peran anggota pramuka masing-masing gugus depan. Keberhasilan penyelenggaraan kegiatan kepramukaan dalam gugus depan dipengaruhi oleh faktor keselarasan pelaksanaan kegiatan dengan penyusunan program yang telah dibuat.

Penyusunan program kegiatan ekstrakurikuler pramuka di SDN 3 Pancor dilakukan satu kali dalam enam bulan. Di MI Hamzanwadi 1 Pancor dan SDN 2 Selong dilakukan satu kali dalam satu tahun. Penyusunan program terbagi menjadi tiga bagian, yaitu program jangka pendek, menengah, dan panjang. Pembagian program tetap berpedoman pada prinsip dasar kepramukaan dan isi SKU atau syarat-syarat kecakapan umum golongan penggalang.

Kegiatan kepramukaan yang dilaksanakan di SDN 3 Pancor, di antaranya: pelantikan anggota baru gerakan pramuka yang diikuti oleh siswa yang berusia 7-10 tahun (pramuka siaga), dan 11-12 tahun (pramuka penggalang) SD, yang dilaksanakan dalam satu tahun sekali; pengisian SKU dan pelantikan kenaikan tingkat wajib diikuti oleh anggota gerakan pramuka di SDN 3 Pancor, yang dilaksanakan dalam enam bulan sekali;kegiatan perkemahan Jumat, Sabtu, dan Minggu (perjusami) yakni kegiatan kemah yang dilakukan selama tiga hari di lingkungan sekolah, seperti: latihan baris-berbaris, pendirian tenda, semaphore, kegiatan keagamaan, upacara api unggun, penjelajahan, pentas seni, dan kegiatan menarik lainnya; anggota aktif mengikuti latihan gabungan (latgab) dan perlombaan antara gugus depan, kwartir ranting dan cabang; kegiatan kemah bakti dan apresiasi anggota pramuka; kegiatan latihan rutin sekali dalam satu minggu yang dilaksanakan setiap hari Kamis pukul 15.30-17.30 WITA; dan kegiatan gladi pinru (pimpinan regu) dan latihan khusus untuk anggota inti yang akan dipersiapkan untuk mengikuti perlombaan.

MI Hamzanwadi 1 Pancor merupakan salah satu Madrasah Ibtidaiyah percontohan di Kecamatan Selong karena prestasinya terutama dalam lomba pramuka. Dibalik prestasinya yang gemilang tersebut, terdapat beberapa program yang telah disusun di antaranya: penerimaan atau pengukuhan anggota golongan siaga menjadi anggota golongan penggalang yang dilaksanakan sekali dalam satu tahun; perkemahan Sabtu dan Minggu (persami) dirangkaikan dengan evaluasi materi yang telah dilaksanakan selama enam bulan, biasanya persami dilaksanakan pada saat siswa libur semester atau kemahan hari jadi gerakan pramuka; kegiatan peduli lingkungan dengan melakukan bersih-bersih atau *zero waste* di lingkungan Yayasan Pendidikan Hamzanwadi NW Lombok Timur sebagai kontribusi untuk menyukseskan *world clean up day* 2019; ikut serta dalam latihan gabungan (latgab) dan perlombaan (LT I, LT II, dan LT III), dan lomba yang dilaksanakan oleh Racana (Temu Aksi Galang Penegak (TAKSI), Kemah Silaturrahmi (KSLP3), Lintas Galang Ridhol Walidain (LIGARDA), dan Nurul *Harmain Scout Camp Competition (NHSCC)*; latihan rutin yang dilaksanakan pada hari Jumat pukul 15.30-17.30 WITA; dan latihan khusus pada hari Sabtu dan Minggu sore bagi anggota regu inti yang telah diseleksi sebagai perwakilan mengikuti lomba.

Kegiatan kepramukaan yang diprogramkan di SDN 2 Selong, yaitu: kegiatan perkemahan Sabtu dan Minggu

(persami) yang dilaksanakan setiap satu tahun sekali pada tahun pelajaran baru dan dirangkaikan dengan pengukuhan anggota gerakan pramuka golongan penggalang; kegiatan latihan rutin yang dilakukan setiap hari Sabtu pukul 15.30-17.30 WITA yang wajib diikuti oleh seluruh anggota pramuka golongan siaga dan golongan penggalang;kegiatan latihan khusus bagi regu yang terpilih untuk mewakili gudep dalam kegiatan lomba, yang dilaksanakan setiap hari Sabtu pukul 13.00-15.00 WITA; kegiatan kemah uji kenaikan golongan dan tingkat yang dilaksanakan pada akhir semester, kegiatan ini juga dilakukan dengan penjelajahan sebelum anggota pramuka dinyatakan lulus dan berhak mendapatkan Tanda Kecakapan Umum (TKU) penggalang ramu, rakit, dan terap.

Penyelenggaraan ekstrakurikuler pramuka merupakan kegiatan wajib di SDN 3 Pancor, MI Hamzanwadi 1 Pancor, dan SDN 2 Selong. Kurikulum yang dikembangkan oleh ketiga sekolah tersebut menggunakan K13. Peran kegiatan pramuka dapat mendorong kompetensi, sikap, karakter, serta mendukung kegiatan kurikuler siswa yang dilaksanakan dalam proses pembelajaran di sekolah. Implementasi K13 dalam pembelajaran di kelas dilaksanakan menggunakan metode kepramukaan. Kegiatan kepramukaan dilaksanakan sesuai dengan kebutuhan anggota gerakan pramuka, tetap berpedoman pada prinsip dasar pramuka, dan kompetensi yang harus dicapai anggota pramuka dalam pedoman syarat-syarat kecakapan umum.

Metode kepramukaan yang dilaksanakan di SDN 3 Pancor, MI Hamzanwadi 1 Pancor, dan SDN 2 Selong telah dikembangkan sehingga kegiatan semakin menarik, menantang, dan meningkatkan rasa keingintahuan anggota pramuka. Metode yang dikembangkan dalam setiap kegiatan digunakan delapan mteode kepramukaan. *Pertama*, mengamalkan kode kehormatan pramuka tertuang dalam Tri Satya dan Dasa Dharma pramuka yang diucapkan pada saat pelantikan sebagai janji yang harus dijalankan atau diterapkan dalam kehidupan sehari-hari baik dalam lingkungan sekolah, rumah, maupun masyarakat, sehingga perilaku anggota sesuai dengan ikrar yang telah diucapkan. Selain itu, membina kesadaran beragama, peduli lingkungan, menempati janji, dan bersikap jujur dalam setiap kegiatan.

Kedua, bimbingan, dorongan, dan dukungan dari pembina pramuka dalam setiap kegiatan. Keberadaan orang dewasa sebagai orang yang digugu, ditiru, dan sebagai orang yang memberikan batasan kepada siswa. Karena kegiatan pramuka dilakukan di alam terbuka, dibutuhkan keberadaan dari orang dewasa untuk mencegah hal-hal yang tidak diiginkan. Keberadaan orang dewasa, seperti: kepala sekolah, guru, dan pembina terlibat aktif ketika perlombaan dengan menasihati, memotivasi, mengawasi, dan mengevaluasi pada saat sebelum, sesaat, dan sesudah kegiatan sebagai bentuk keterlibatan orang dewasa dalam kegiatan pramuka.

Ketiga, kegiatan dilakukan secara berkelompok, berkerja sama, dan siap berkompetisi. Membagi anggota pramuka ke dalam sistem kelompok atau regu yang memiliki tujuan untuk meningkatkan semangat kerjasama antara anggota pramuka. Setiap regu terdapat pimpinan regu yang memudahkan pembina membangun koordinasi antara anggota pramuka dalam regu dengan tugas yang diberikan, sehingga dapat diselesaikan dengan cepat dan lebih baik. Melalui sistem regu juga dapat meningkatkan semangat berkompetisi anggota dan setiap regu, dengan melakukan kerja keras agar mendapatkan hasil yang lebih maksimal.

Keempat, pelaksanaan kegiatan dilakukan secara menarik, menantang,dan kegiatan mengadung nilai pendidikan berdasarkan perkembangan rohani dan jasmani anggota. Kegiatan dilaksanakan memberikan rasa senang dan antusias untuk mengikuti kegiatan tanpa ada unsur paksaan. Dengan pendekatan baru, melalui kegiatan pentas seni dan budaya, penjelajahan, dan memainkan permainan tradisional dapat meningkatkan motivasi belajar anggota muda.

Kelima, kegiatan yang dilakukan memiliki karakteristik *learning by doing*, yakni setiap kegiatan materi yang disampaikan kemudian dilanjutkan dengan praktik, contohnya: materi baris-berbaris, sandi, semaphore, *pionering*/tali-temali, morse, PPPK dan kesehatan. Tujuan *learning by doing* untuk memberikan kemudahan kepada anggota pramuka dalam memahami materi yang disampaikan, memiliki rasa keingintahuan anggota dengan hal-hal yang baru, dan memberikan keterampilan serta pengalaman.

Keenam, kegiatan pramuka miliki ciri khas tersendiri, yaitu hampir rata-rata kegiatan dilakukan di alam terbuka karena alam merupakan salah satu sumber belajar yang dapat dimanfaatkan, karena setiap tempat adalah sumber belajar untuk anggota. Selain itu, kegiatan seperti: kemah bakti pramuka, perkemahan Sabtu-Minggu (persami), dan kemah pelantikan dapat memberikan suasana belajar baru dan mengajarkan anggota untuk hidup sederhana, apa adanya, dan mandiri di alam bebas.

Ketujuh, menggunakan satuan terpisah antara kelompok (regu) putra dan putri, yang memiliki tujuan untuk memudahkan kegiatan yang disesuaikan dengan jenis kelamin, karena kegiatan dan kebutuhan antara anggota putra dan putri berbeda. Dalam administrasi gerakan pramuka telah diatur, mulai dari penomoran gugus depan, sampai pada pembina satuan menerapkan satuan terpisah. Namun, tidak menutup kemungkinan antara pembina putra dan putri dapat melakukan kerjasama dalam kegiatan latihan dan perlombaan, begitu juga antara anggota regu putra dan regu putri. Pada umumnya, pembagian anggota pramuka golongan penggalang di lokasi penelitian membagi menjadi dua regu, yaitu anggota regu umum dan regu khusus/inti. Regu umum merupakan seluruh anggota muda yang ada di gugus depan tersebut yang terbagi ke dalam beberapa kelompok. Sedangkan regu khusus/inti adalah regu atau kelompok yang telah diseleksi menjadi perwakilan gugus depan untuk mengikuti perlombaan atau latihan gabungan. Pemilihan regu khusus/inti berdasarkan keatifan anggota regu dan pencapaian hasil maksimal dalam setiap latihan.

Kedelapan, pemberian penghargaan berupa tanda kecakapan (SKU dan SKK), setiap anggota pramuka diharuskan mengisi SKU dan mengikuti ujian SKK. Tanda kecakapan diberikan kepada nggota muda sebagai simbol bahwa anggota telah menguasai materi serta segala bentuk keterampilan-keterampilan yang diujikan. Anggota pramuka yang mengikuti ujian adalah anggota yang mempunyai minat yang tinggi dalam kegiatan pramuka, karena harus mengikuti serangkaian proses, mulai dari pengisian dan ujian, sampai pada proses pelantikan dan penyematan.

Pendidikan pramuka merupakan sebagai sarana yang tepat sebagai bentuk penguatan pendidikan karakter, kepribadian, dan pengamalan nilai-nilai pramuka dalam kehidupan sehari-hari bagi anggota. Keberadaan kegiatan pramuka dalam satuan pendidikan untuk mendukung intrakurikuler dan kokurikuler, serta mendukung pengembangan pendidikan

karakter di sekolah dengan proses elaborasi visi dan misi sekolah dan dilaksanakan melalui aktivitas intrakurikuler dan ekstrakurikuler (Murdiono, Miftahuddin, & Kuncorowati, 2017). Dalam mencapai tujuan tersebut, kegiatan dilaksanakan melalui delapan motode kepramukaan, yaitu dengan mengamalkan kode kehormatan, kegiatan belajar sambil melakukan, kegiatan (berkelompok, berkerja sama, dan berkompetisi), kegiatan yang didesain secara menarik dan menantang, kegiatan yang dilakukan di alam terbuka, orang dewasa memberikan bimbingan, dorongan, dan dukungan, pemberian pengahargaan tanda kecakapan, sertasistem satuan terpisah (putra dan putri). Metode dirancang untuk memberikan pengalaman belajar, meningkatkan rasa ingin tahu siswa, serta mencapai tujuan tertentu. Implementasi delapan metode kepramukaan tersebut berpotensi sebagai sarana menguatkannilai-nilai karakter, seperti: religius, disiplin, tanggung jawab, jujur, memiliki rasa ingin tahu, kreatif, mandiri, demokratis, toleransi, komunikatif, cinta tanah air, peduli lingkungan, peduli sosial, menghargai prestasi, dan kerja keras. Hal ini dapat dilihat dari Tabel 1.

Sekolah menyadari bahwa keberadaan ekstrakurikuler pramuka sebagai tempat untuk mendukung penguatanpendidikan karakter siswa. Keberadaan kepala sekolah, guru, dan pembina sangat memberikan dampak positif terhadap semangat siswa untuk mengikuti kegiatan pramuka. Disisi lain, kegiatan pramuka disesuaikan dengan materi pelajaran siswa dapatkan di sekolah, sehingga terdapat integrasi antara mata pelajaran dengankegiatan kepramukaan. Secara teori, siswa mendapatkannya dari guru mata pelajaran, sedangkan secara praktik dilaksanakan melalui kegiatan pramuka. Implementasi metode *leraning by doing* dapat memberikan pengetahuan dan pengalaman belajar, terutama ditekankan untuk membentuk karakter siswa. Hal ini sejalan dengan tujuan dari K13 untuk mengupayakan terbentuknya sikap dan perilaku (moral) siswa, meskipun ada beberapa aspek lain juga diharapkan, antara lain: keterampilan, pengetahuan, sosial, dan spiritual. Namun, pembentukan karakter siswa memiliki kedudukan yang paling utama untuk kesuksesan siswa di masa depan. Salah satu strategi yang dapat dimanfaatkan oleh sekolah adalah mengoptimalkankegiatan-kegiatan yang positif, salah satunya kegiatan kepramukaan. Kegiatan ekstrakurikuler pramuka menjadi wajib pada K13, sehingga proses pembelajaran di sekolah diselenggarakan dengan menggunakan metode kepramukaan (Nailiyah, Dayati, & Desyanty, 2018).

Siswa dihadapkan dengan persoalan yang kompleks di masa yang akan datang, seperti dekadensi moral, *westernisasi* budaya, dan generasi muda kehilangan jati diri sebagai bangsa Indonesia. Salin itu, revolusi ilmu pengetahuan, informasi, interdependensi antara anggota dan kelompok masyarakat akan menjadi tantangan di masa yang akan datang sehingga dalam keadaan ini masyarakat akan mengalami metamorfosis menuju masyarakat terbuka/*open society* (Raharjo, 2010). Salah satu strategi untuk mengantisipasi persoalan tersebut adalah menguatkan peran pendidikan, terutama dalam penguatan pendidikan karakter. Hal ini menunjukkan pendidikan karakter melalui aktivitas intrakurikuler, kokurikuler, dan ekstrakurikuler masih tetap dibutuhkan untuk dilaksanakan secara holistik dan serentak berbasis pada pengembangan budaya sekolah.

Salah satu aktivitas positif yang dapat diupayakan dalam membentuk karakter kepada siswa sekolah dasar adalah dengan mengoptimalkan program-program

Tabel 1
Implementasi Metode Kepramukaan dan Penguatan Nilai-nilai Karakter Siswa

No	Metode Kepramukaan	Deskripsi Kegiatan	Nilai Karakter
1	Mengamalkan kode kehormatan pramuka	- Pengamalan "Tri Satya dan Dasa Dharma Pramuka" - Mengembangkan perilaku baik di lingkungan sekolah, rumah, maupun masyarakat - Membina kesadaran beragama, peduli lingkungan, menempati janji, dan bersikap jujur dalam setiap kegiatan	Religius, disiplin, tanggung jawab, dan jujur
2	Kegiatan belajar sambil melakukan	- Mengasah rasa keingintahuan anak dengan hal-hal baru - Pendidikan keterampilan dan pengalaman	Memiliki rasa ingin tahu, kreatif, dan kerja keras
3	Kegiatan berkelompok, berkerjasama, dan berkompetisi	- Membagi anggota pramuka ke dalam kelompok (regu) - Lomba tingkat (gugus depan, ranting, cabang, daerah, dan nasional)	Demokratis, tanggung jawab, toleransi, dan komunikatif
4	Kegiatan yang menarik dan menantang	- Kegiatan pentas seni dan budaya - Penjelajahan dengan sistem pos - Memainkan segala bentuk permainan, termasuk permainan tradisional	Kreatif, mandiri, rasa ingin tahu, cinta tanah air, dan kerja keras
5	Kegiatan di alam terbuka	- Kemah bakti pramuka - Perkemahan Sabtu-Minggu (persami) - Kemah penerimaan dan pelantikan anggota baru	Religius, peduli lingkungan, peduli sosial, mandiri, dan menghargai prestasi
6	Memberikan bimbingan, dorongan, dan dukungan	- Kepala sekolah, guru, dan pembina terlibat aktif dalam kegiatan perlombaan, serta memberikannasihat dan motivasi anggota - Pengawasan dan evaluasi pada saat sebelum, sesaat, dan sesudah kegiatan	Jujur, disiplin, dan bertanggungjawab
7	Pemberian pengahargaa tanda kecakapan	- Setiap anggota pramuka diharuskan mengisi SKU golongan siaga dan golongan penggalang - Pengujian SKU/SKK dan penyematan tanda kecakapan anggota pramuka	Menghargai prestasi, kerja keras, mandiri, dan disiplin
8	Satuan terpisah (putra dan putri)	- Administrasi, nomor gugus depan, dan pembina satuan menerapkan satuan terpisah. - Kegiatan disesuaikan dengan jenis kelamin antara anggota putra dan putri	Komunikatif, mandiri, dan tanggung jawab

kepramukaan yang disusun berdasarkan kebutuhan siswa dan budaya sekolah. Penyusunan program kegiatan kepramukaan disusun bersama dengan melibatkan kepala sekolah, pembina, komite, dan wali murid. Hal ini dilakukan untuk memudahkan semua aspek ikut terlibat dan bertanggung jawab dalam kegiatan kepramukaan di sekolah. Keterlibatan warga sekolah, keluarga dan masyarakat memberikan dampak pada pembiasaan karakter baik yang dapat dilakukan secara berulang-ulang dan konsisten (Kurniawan, 2015).

Hasil penelitian di lapangan, penyusunan program tetap mengacu pada SKU (Syarat-syarat Kecakapan Umum) dan SKK (Syarat-syarat Kecakapan Khusus), serta visi dan misi sekolah yang dielaborasikan sehingga tersusun menjadi program ekstrakurikuler pramuka, yang terbagi ke dalam beberapa program jangka pendek, menengah, dan panjang.

Karakter siswa dapat dibentuk dengan melaksanakan program ektrakurikuler pramuka yang telah tersusun berdasarkan prinsip kebutuhan dan komitmen dari sekolah, keluarga, dan masyarakat. Oleh karena itu, butuh cara yang tepat dan memahami perkembangan siswa dalam rangka penguatan pendidikan karakter kepada anggota muda. Anggota pramuka golongan penggalang sekolah dasar berusia antara 11-12 tahun. Pada usia ini siswa masih membutuhkan bimbingan dari orang dewasa secara penuh. Cara yang tepat untuk mengajarkan siswa adalah dengan menggunakan pendekatan pedagogi. Pedagogi secara sederhana merupakan seni dalam mengajar. Hiryanto (2017) menjelaskan pedagogi sebagai teori pengajaran, yang dimana pendidik memiliki *skill* untuk memahami bahan ajar, mengenal karakteristik siswa dan merencanakan cara mengajarnya. Pendidik dalam hal ini adalah pembina memiliki peran sangat penting untuk memiliki kuaifikasi atau kompetensi khusus untuk mengajarkan pramuka pada siswa sekolah dasar. Berdasarkan penelitian Woro dan Marzuki (2016) dijelaskan faktor sikap, pengetahuan, dan pengalaman yang dimiliki pembina merupakan salah satu faktor pendukung pembentukan karakter pada anak. Oleh karena itu, untuk meningkatkan kualifikasi pembina, mereka diharuskan telah mengikuti pelatihan khusus untuk pembina, seperti Kursus Mahir Dasar (KMD), Kursus Mahir Lanjutan (KML), Kursus Pembina Dasar (KPD), dan Kursus Pembina Lanjutan (KPL). Dari ketiga lokasi penelitian, pembina gugus depan telah mendapatkan pelatihan pada tingkat KPD sehingga segala bentuk perencanaan dan pelaksanaan kegiatan telah tersusun dengan baik.

Kemampuan pembina sebagai *role model* bagi siswa menjadi salah satu indikator penting keberhasilan program untuk membentuk karakter siswa. Sebelum pelaksanaan kegiatan, empat prinsip dasar kepramukaan menjadi hal penting yang harus dikuasai, yaitu: *pertama*, beriman dan bertakwa kepada Tuhan Yang Maha Esa;k*edua*, peduli terhadap bangsa, negara, manusia, dan isinya; *ketiga,* peduli diri sendiri; *keempat,* mentaati kode kehormatan pramuka. Empat prinsip dasar kepramukaan ini dijadikan sebagai norma hidup anggota yang harus dikembangkan melalui penghayatan dengan dibantu oleh pembina pramuka. Disisi lain, implementasi delapan metode kepramukaan dalam setiap kegiatan, memberikan dampak yang positif terhadap keaktifan dan motivasi siswauntuk mengikuti kegiatan ekstra-kurikuler pramuka. Hasil yang sama juga dijelaskan oleh Nailiyah dkk. (2018) dalam penelitiannya bahwa metode kepramukaan sangat cocok untuk mendorong anak mengikuti kegiatan dan merasakan perubahan pada dirinya yang lebih baik.

Metode kepramukaan mendorong untuk anak belajar secara interaktif dan progresif. *Pertama*, kode kehormatan pramuka yang tertuang dalam Tri Satya yang disebut sebagai janji dan Dasa Dharma Pramuka sebagai ketentuan moral yang harus dijunjung tinggi. Dengan metode ini, pembina dapat menguatkan karakter religus, disiplin, tanggung jawab, dan jujur. Karakter religius terlihat pada pengamalan janji Tri Satya yaitu menjalankan kewajiban terhadap Tuhan Yang Maha Esa. Jadi kegiataan keagamaan menjadi prioritas utama bagi anggota dengan menjalankan salat berjamaah, membaca yasin, dan tausiyah. Karakter disiplin juga dimunculkan dalam implementasi metode ini, bahwa setiap aturan yang telah ditetapkan bersama untuk dijalankan sebaik-baiknya. Sementara itu, karakter tanggung jawab muncul dalam pengamalan kode kehormatan pramuka, yang dimana janji yang telah diucapkan harus dipertanggungjawabkan dalam kehidupan sehari-hari. Sedangkan karakter jujur mencerminkan perilaku anggota yang dapat dipercaya, artinya janji yang telah diucapkan selaras dengan perbuatan anggota.

Kedua, kegiatan belajar sambil melakukan, penekanannya pada proses belajar yang bersifat praktis, yakni kegiatan yang dilakukan diawali dengan penyampaian materi dan dilanjutkan dengan praktik. Misalnya, *pionering*, penjelajahan, LKBB, semaphore, morse, sandi, dan pendirian tenda. Karakter yang dimunculkan adalah memiliki rasa ingin tahu, kreatif, dan kerja keras. Karakter rasa ingin tahu dilihat dari keaktifan anggota dalam bertanya dan berupaya untuk mendalami materi yang diajarkan. Kemudian menumbuhkan karakter kreatif kepada anggota pada saat mereka mampu menghasilkan karya baru dan memiliki solusi yang berbeda dengan apa yang dicontohkan oleh pembina, misalnya pembuatan pionering tiang bendera, anak sudah mampu menciptakan pionering yang lebih kreatif dibandingkan apa yng ditugaskan. Dan karakter kerja keras anggota muncul pada saat mereka berusaha mencari solusi dalam memecahkan sandi, morse, dan semaphore.

Ketiga, sistem berkelompok/regu, dengan tujuan memberikan anggota kesempatan belajar memimpin, dipimpin, dan memikul tanggung jawab. Selain itu, penggunaan sistem regu memudahkan penyelesaian tugas yang diberikan, dan memberikan kesempatan bagi anggota dalam regu untuk dapat belajar dengan anggota yang lebih bisa. Penerapan dari metode sistem berkelompok/ regu dapat menguatkan karakter demokratis, tanggung jawab, toleransi, dan komunikatif. Karakter demokratis muncul ketika anggota diamanahkan sebagai pemimpin regu, dia harus bertindak dan bersikap tidak memihak, serta tidak menang sendiri. Sedangkan karakter tanggung jawab dilihat dari kemampuan anak dalam mengkoordinir anggota dalam regunya. Sementara karakter toleransi terletak pada bagaimana anggota dalam regu dapat memahami perbedaaan pendapat, suku, dan agama yang berbeda dengan dirinya. Kemudian karakter komunikatif adalah anggota berupaya untuk memberikan kontribusi kepada kelompoknya, baik itu ide atau solusi, kreativitas, dan tindakan.

Keempat, kegiatan yang menarik dan menantang dengan melakukan kegiatan baru atau modern, sehingga kegiatan memiliki daya tarik dan siswa merasa tertantang untuk melakukannya. Melalui metode ini ada dapat menguatkan karakter kreatif, mandiri, rasa ingin tahu, cinta tanah air, dan kerja keras. Kegiatan pembina dalam menggunakan metode ini dengan cara memberikan kebebasan kepada siswa untuk mencoba hal-hal yang baru untuk mengasah potensi yang mereka miliki, seperti: bernyanyi, bermain peran (drama), mementaskan kesenian tari, pembacaan puisi, dan lain-

lain. Melalui cara ini dapat menguatkan karakter kreatif, mandiri dan rasa ingin tahu siswa. Sementara dalam kegiatan lain, pembina pada saat latihan memberikan anggota untuk memainkan satu macam permainan tradisional nusantara, maka kegiatan ini dapat menguatkan karakter cinta tanah air. Dalam kegiatan lain yaitu melalui penjelajahan, siswa berusaha untuk memecahkan tugas atau soal-soal yang ada disetiap pos penjelajahan sehingga kegiatan ini dapat menguatkan karakter kerja keras

Kelima, kegiatan yang dilakukan di alam terbuka dengan melakukan perkemahan untuk dapat melatih anggota pramuka dapat bertahan hidup mandiri di alam terbuka secara sederhana. Karakter yang munculkan dalam metode ini yaitu karakter religius, peduli lingkungan, peduli sosial, mandiri, dan menghargai prestasi. Meskipun kegiatan dilakukan di alam terbuka kegiatan keagmaan tetap dijaga dan diperhatikan. Selain itu, menjaga kebersihan alam dan tidak merusak lingkungan dengan melakukan sapu bersih dan mengumpulkan sampah adalah bentuk penerapan dari karakter peduli lingkungan.

Karakter peduli sosial dilihat dari kegiatan "jika aku menjadi" memberikan dampak positif terhadap kepedulian anggota dengan lingkungan sosial disekitarnya. Setiap anggota harus dapat menyelesaikan tugas dengan baik, misalnya ketika diamanahkan oleh teman regunya untuk menjaga tenda dan memasak nasi atau lauk adalah wujud dari karakter mandiri. Sementara karakter menghargai prestasi dilihat dari kegiatan perkemahan biasanya dilaksanakan lomba dan memberikan *reward* kepada regu yang teraktif, ketika regu lain tidak mendapatkan penghargaan maka pembina mengarahkan dan mendorong anggota untuk terus melakukan yang terbaik dan menghargai prestasi yang telah didapatkan regu lain.

Keenam, pembina memiliki peran sebagai organisator dalam merencanakan, melaksanakan, mengontrol/mengawasi, bertanggungjawab, dan menilai setiap kegiatan. Pembina dapat memberikan dorongan, bimbingan, dan motivasi kepada anggota muda. Karakter yang muncul melalui metode ini yaitu jujur, disiplin, dan bertanggungjawab. Munculnya karakter jujur ketika siswa mendapatkan masalah dengan menyampaikan secara langsung apa yangdialami untuk diselesaikan secara bersama-sama. Peran pembina dalam menguatkan karakter disiplin dengan cara setiap siswa mendengarkan dan mematuhi larangan agar tidak menimbulkan hal-hal yang tidak diinginkan. Walaupun pembina sebagai organisator dalam gudep, akan tetapi pembina mengajarkan kepada anggota untuk tetap menjaga tanggung jawab secara bersama-sama.

Ketujuh, pemberian tanda kecakapan SKU dan SKK kepada nggota yang telah menyelesaikan tugas dan menguasai keterampilan-keterampilan tertentu. Hal ini bertujuan untuk meningkatkan semangat jiwa pramuka untuk dapat mengamalkan nilai-nilai kepramukaan dalam kehidupan sehari-hari. Pemberian penghargaan kepada anggota dapat menguatkan karakter menghargai prestasi, kerja keras, mandiri, dan disiplin.

Karakter menghargai prestasi dengan mendorong siswa untuk terus memberikan kontribusi kepada dirinya dan orang lain, serta menghargai kapasitas atau kemampuan yang dimiliki orang lain. Kegiatan pramuka diupayakan untuk dapat menciptakan suasana untuk menjunjung tinggi prestasi dengan menjalani ujian kenaikan tingkat dan golongan Sedangkan karakter mandiri dilihat dari bagaimana anggota untuk mencari dewan penguji SKU secara mandiri. Materi yang berkaitan dengan keagamaan maka anggota pramuka

mencari guru agama, ujian berkaitan dengan nasionalisme anggota pramuka mencari guru kelas atau yang paham tentang nasionalisme. Jadi, siswa sudah diajarkan secara mandiri sejak dini untuk melatih mental dan kompetensinya. Kemudian karakter disiplin dimunculkan dari ketentuan yang ada dalam SKU dan SKK.

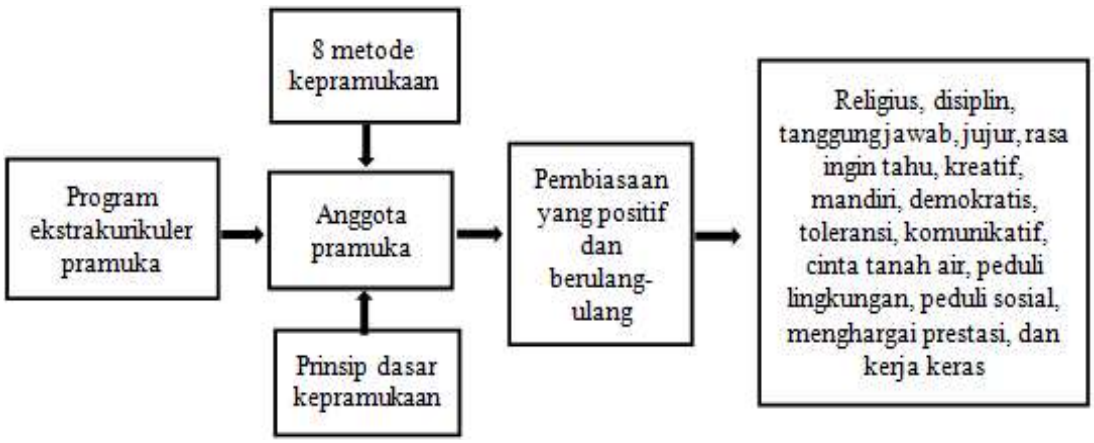
Kedelapan, menekankan pada sistem satuan terpisah antara putra dan putri. Hal ini dimaksudkan untuk memudahkan pembinaan anggota pramuka berdasarkan kebutuhan, karena antara kegiatan putra dan putri terdapat perbedaan yang signifikan dan masing-masing dibina berdasarkan sistem satuan terpisah, kecuali untuk perindukan siaga. Karakter yang dimunculkan melalui penerapan metode ini seperti karakter komunikatif, mandiri, dan tanggung jawab. Karakter komunikatif dilihat dari sikap dan tindakan anggota dalam mendorong dirinya untuk berkontribusi terhadap kelompok atau regunya. Selain itu, karakter mandiri dan tanggung jawab dimunculkan dari kemampuan masing-masing regu untuk dapat menyelesaikan tugas dan kewajibannya terhadap diri sendiri dan orang lain.

Implementasi delapan metode kepramukaan tidak dapat dilaksanakan secara satu persatuatau berdiri sendiri, karena metode tersebut merupakan satu rangkaian kegiatan, dan memungkinkan kedelapan dari metode kepramukaan dijalankan secara bersamaan atau serentak dan berkelanjutan. Melalui metode kepramukaan, siswa merasa antusias dan termotivasi untuk mengikuti seluruh rangkaian kegiatan kepramukaan. Oleh karena itu, metode kepramukaan sangat cocok diterapkan dalam setiap kegiatan kepramukaan untuk memberikan motivasi dan menguatkan pendidikan karakter siswa yang lebih baik.

Berdasarkan penjabaran di atas, dalam menguatkan pendidikan karakter pada siswa sekolah dasar dapat diformulasikan dalam bentuk model seperti yang disajikan pada Gambar 1.

Pada prinsipnya dalam menguatkan karakter siswa melalui penerapan metode kepramukaan harus ditanamkan secara konsisten, holistik, dan terintegrasi. Peran dari sekolah, keluarga, dan masyarakat

Gambar 1. Model dalam Menguatkan Pendidikan KarakterAnak melalui Kegiatan Kepramukaan



menjadi penting dalam membangun budaya lingkungan yang baik bagi siswa dengan pembiasaan yang positif dan berulang-ulang. Karena pendidikan karakter akan bepengaruh kepada siswa ketika dilakukan secara integral dan simultan antara ketiga peran, yakni sekolah, keluarga, dan masyarakat (Raharjo, 2010).

Menguatkan karakter siswa sekolah dasar bukanlah perkara mudah, akan tetapi karakter siswa bisa terjaga dengan baik apabila telah melewati beberapa tahapan, yaitu pengetahuan tentang karakter, diterapkan dalam kehidupan sehari-hari yang menjadi perilaku, dan perilaku tersebut dilakukan secara berulang-ulang secara konsisten sehingga menjadi sebuah kebiasaan (*habit*).

SIMPULAN

Berdasarkan hasil penelitian membuktikan bahwa implementasi delapan metode kepramukaan terdiri dari: mengamalkan kode kehormatan pramuka, memberikan bimbingan dan motivasi dari pembina, menyelenggarakan kegiatan secara berkelompok, menyelenggarakan kegiatan yang menarik dan menantang, melakukan aktivitas sambil belajar, menyelenggarakan kegiatan di alam terbuka, menerapkan sistem satuan terpisah, serta memberikan penghargaan tanda kecakapan (SKU dan SKK). Pelaksanaan metode kepramukaan berpotensi sebagai sarana yang tepat untuk menguatkan karakter siswa sekolah dasar. Karakter tersebut antara lain: sikap religius, disiplin, tanggung jawab, jujur, memiliki rasa ingin tahu, kreatif, mandiri, demokratis, toleransi, komunikatif, cinta tanah air, peduli lingkungan, peduli sosial, menghargai prestasi, dan kerja keras. Metode kepramukaan semestinya dapat dikembangkan dan diimplementasikan oleh guru dalam proses pembelajaran di sekolah dasar sebagai bentuk penguatan karakter siswa.

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PENDIDIKAN KARAKTER ANAK USIA DINI DALAM DIMENSI BERKETUHANAN

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Abstrak

Penelitian ini bertujuan untuk membuktikan dimensi pendidikan karakter anak usia dini terkait dengan hubungan ketuhanan. Metode penelitian yang digunakan adalah kuantitatif. Subjek penelitian sebanyak 451 anak yang berasal dari 26 lembaga PAUD di wilayah Daerah Istimewa Yogyakarta. Teknik pengumpulan datanya menggunakan kuesioner. Analisis data menggunakan *confirmatory factor analysis second order*. Kriteria yang digunakan untuk menyatakan model konstruk fit (kecocokan model) adalah absolute fit indices, incremental fit indicies, dan persimonius. Hasil penelitian ini juga menunjukan bahwa dimensi karakter anak usia dini yang berkaitan dengan hubungan ketuhanan terdiri atas: keyakinan/akidah, rajin beribadah, sikap ikhlas bertindak, dan nilai budi pekerti/ akhlakul karimah. Nilai sikap ikhlas bertindak merupakan faktor dominan sedangkan nilai budi pekerti/akhlakul karimah merupakan faktor yang kurang dominan pada pendidikan karakter anak usia dini di PAUD yang ada di Daerah Istimewa Yogyakarta. Semua indikator tersebut memberikan kontribusi terhadap sikap atau perilaku anak terkait dengan hubungan ketuhanan.

Kata kunci: *pendidikan karakter, anak usia dini, hubungan ketuhanan*

DIMENSIONS OF EARLY CHILDHOOD EDUCATION CHARACTERS RELATED TO GOD'S RELATIONSHIP

Abstract

This study aims to examine the dimensions of early childhood character education related to the divine relationship. This study method used was quantitative research. The research subjects were 451 kids from 26 preschool institutions in the Yogyakarta. The data were collected using questionnaire. The data analysis used second order confirmatory factor analysis. The criteria used to state the construct fit model were absolute fit indices, incremental fit indicies, and persimonius. The results show that the dimensions of early childhood character related to the divine relationship consist of: belief / faith, the obidience in worship, sincere action, and noble character . The value of sincere action is the dominant factor, while the noble character is a less dominant factor in early childhood character education in preschool in Yogyakarta. All of these indicators contribute to children's attitudes or behaviors related to divine relationships.

Keywords: *educational character, early childhood, god's relationship*

PENDAHULUAN

Di Indonesia karakter merupakan hal yang sangat penting, karena bangsa Indonesia sangat membutuhkan orang-orang yang berkarakter baik untuk membangun bangsa. Karakter baik adalah ketika seseorang mampuh membiasakan berprilaku terpuji kapan dan dimana berada. Selain itu, kebiasaan tersebut dilakukan ketika dilihat maupun tidak dilihat orang lain. Karakter baik (*good character*) meliputi pengetahuan tentang kebaikan (*cognitives*), niat terhadap kebaikan (*affectives*), dan melakukan kebaikan (*behaviors*) (Lickona, 1991, p. 51).

Keseriusan pemerintah terkait pengembangan karakter terlihat sejak pendidikan karakter dicanangkan oleh presiden ke-6 Republik Indonesia yaitu Susiolo Bambang Yudhoyono dalam peringatan Hari Pendidikan Nasional, tepatnya pada tanggal 2 Mei 2010. Selanjutnya, Presiden Joko Widodo menginginkan untuk dilakukan penguatan pendidikan karakter di segala aspek kehidupan dengan diterbitkannya Peraturan Presiden Republik Indonesia Nomor 87 Tahun 2017 tentang Penguatan Pendidikan Karakter sehingga pendidikan karakter perlu ditanamkan sejak anak menempuh pendidikan di taman kanak-kanak (TK) sampai perguruan tinggi.

Pendidikan karakter pada anak usia dini bertujuan untuk membentuk dan membangun pola pikir, sikap, dan perilaku para anak agar menjadi pribadi yang positif, berakhlak karimah, berjiwa luhur, dan bertanggung jawab dalam kehidupan sehari-hari. Azzet (2011, p. 68) menyatakan bahwa pendidikan karakter adalah suatu sistem yang meliputi komponen pengetahuan, kesadaran atau kemauan, dan tindakan untuk melaksanakan nilai-nilai tersebut. Pendidikan karakter anak usia dini diselenggarakan sebelum jenjang pendidikan dasar melalui pendidikan formal, nonformal, dan atau informal. Pada konteks pendidikan formal dapat berbentuk TK dan raudhatul athfal (RA), serta bentuk lainnya yang sederajat. Sementara pada jalur non formal dapat berbentuk kelompok bermain (KB) dan tempat penitipan anak (TPA), serta bentuk lainnya yang sederajat. Sedangkan jalur pendidikan informal berbentuk pendidikan keluarga atau pendidikan yang diselenggarakan oleh lingkungan (Helmawati, 2015, p. 6).

Pendidikan anak usia dini tidak hanya memenuhi hak azasi manusia mendapatkan pendidikan sedini mungkin melalui jalur formal, nonformal dan informal, melainkan juga sebagai peletakan dasar fondasi bagi pertumbuhan dan perkembangan segala potensi diri anak. Tujuan pendidikan anak usia dini adalah sebagai berikut. *Pertama,* anak mampu melakukan ibadah, mengenal dan percaya akan ciptaan Tuhan dan mencintai sesama manusia. *Kedua,* anak mampu berpikir logis, kritis, memberikan alasan, memecahkan masalah dan menemukan hubungan sebab akibat. *Ketiga,* anak mampu mengenal lingkungan alam, lingkungan sosial, peran masyarakat dan menghargai keragaman sosial dan budaya serta mampu mengembankan konsep diri, sikap positif terhadap belajar, kontrol diri, dan rasa memiliki (Sujiono & Nurani, 2012, pp. 42-43). Pada dasarnya penyelenggaraan pendidikan karakter di sekolah dapat dilakukan secara terpadu pada setiap kegiatan sekolah. Setiap aktivitas peserta didik di sekolah dapat digunakan sebagai media untuk menanamkan karakter, mengembangkan konasi, dan memfasilitasi peserta didik berperilaku sesuai nilai-nilai yang berlaku (Rochayati & Wardani, 2018).

Penanaman nilai karakter tersebut merupakan hal yang sangat sulit. Oleh karena itu, pada tingkat PAUD dipilih beberapa nilai karakter utama yang disarikan dari butir-butir SKL PAUD (Permendiknas

Nomor 23 tahun 2010) dan SK/KD (Permendiknas Nomor 22 tahun 2010). Berikut adalah aspek karakter utama yang dimaksud dan didiskripsikan secara ringkas. *Pertama,* nilai karakter dalam hubungannya dengan ketuhanan: pikiran, perkataan, dan tindakan seseorang yang diupayakan selalu berdasarkan pada nilai-nilai ketuhanan dan atau ajaran agamanya. *Kedua,* nilai karakter dalam hubungannya dengan diri sendiri: jujur, toleransi, disiplin, kerja keras, kreatif, mandiri, demokratis, rasa ingin tahu, semangat kebangsaan, cinta tanah air, menghargai prestasi, bersahabat, cinta damai, gemar membaca, peduli lingkungan, peduli sosial, tanggung jawab. *Ketiga,* nilai karakter dalam hubungannya dengan sesama: sadar akan hak dan kewajiban diri dan orang lain; patuh pada aturan-aturan hukum dan adat; menghargai karya dan prestasi orang lain; perilaku santun sesama orang. *Keempat,* nilai karakter hubungannya dengan lingkungan: sikap dan tindakan yang selalu berupaya mencegah kerusakan pada lingkungan alam di sekitarnya, selalu ingin memberi bantuan bagi orang lain dan masyarakat yang membutukan. *Kelima,* nilai kebangsaan; cara pikir, wawasan yang menempatkan kepentingan bangsa dan negara di atas kepentingan diri dan kelompoknya; nasionalis; menghargai keberagaman (Kemendiknas, 2010, pp. 16-19).

Persoalan yang tidak kalah penting dalam pendidikan karakter anak usia dini adalah karakter terkait dengan hubungan Tuhan yang mahakuasa (ketuhanan). Dalam kontes ini, Azzet (2011, pp. 88-89) menyatakan bahwa, anak harus dikembangkan karakternya agar benar-benar berkeyakinan, bersikap, berkata-kata dan berprilaku sesuai dengan ajaran agama yang dianutnya. Kepercayaan yang dimiliki akan mengantarkan anak memiliki karakter yang baik, sehingga terbentuk konsep diri yang baik. Cinta Tuhan dan segenap ciptaannya adalah merupakan bagian dari pilar karakter (Wulandari, Wijayanti, & Saliman, 2019).

Pendidikan karakter anak usia dini di lembaga formal, nonformal, dan atau informal salah satu tujuannya yaitu mendidik anak untuk selalu tertib dan disiplin dalam beribadah secara terus menerus. Membiasakan anak untuk beribadah maka didalam dirinya akan tertanam sistem keyakinan yang kuat. Dalam konteks ini, Majid dan Andayani (2013, p. 101) menyatakan bahwa, keyakinan (aqidah) yang kuat dan bersih pada diri seseorang, akan memiliki ikatan yang kuat dengan Tuhan yang maha kuasa, sehingga segala perbuatan atau tindakannya tidak akan menyimpang dari jalan dan ketentuan yang telah ditetapkan. Selain itu, seseorang akan menyerahkan segala perbuatannya hanya kepada Tuhan sebagai pencipta alam semesta.

Dalam perkembangan kepercayaan pada anak usia dini, Desmita (2014, p. 279) membaginya menjadi tiga tahap yaitu: *tahap prima faith* (usia 0-2 tahun) ditandai dengan rasa percaya dan setia anak pada pengasuhnya; *tahap intuitive-projective faith* (usia 2-7 tahun). Pada tahap ini kepercayaan anak bersifat peniruan, karena kepercayaan yang dimilikinya masih merupakan gabungan hasil pengajaran dan contoh-contoh signifikan dari orang dewasa; dan *tahap mythic-literal faith* (usia 7-11 tahun). Pada tahap ini, anak secara sistematis mulai mengambil makna dari tradisi masyarakatnya. Gambaran tentang Tuhan diibaratkan sebagai seorang pribadi, orang tua atau penguasa yang bertindak dengan sikap tegas.

Sjarkawi (2015, p. 32) menyatakan bahwa akhlak mengajarkan bagaimana seseorang seharusnya berhubungan dengan Tuhan penciptanya, sekaligus bagaimana

seseorang seharusnya berhubungan dengan sesama manusia. Lebih lanjut Sjarkawi (2015) menegaskan orang yang berakhlak akan menjujung tinggi nilai-nilai antara lain kasih sayang, kebenaran, kebaikan, kejujuran, keindahan, amanah, tidak menyakiti orang lain, dan sejenisnya. Rohmadi dan Taufik (2010) menyatakan secara etimologi, kata akhlak yang berarti tabiat; budi pekerti, kebiasaan atau adat; keperwiraan, kesatriaan, kejantanan, agama; dan kemarahan. Hal ini menunjukkan bahwa untuk menjadi pribadi berakhlak dapat ditunjukkan dengan mematuhi nilai-nilai kebiasaan atau adat yang telah ditetapkan. Nilai keyakinan/akidah, rajin beribadah, sikap ikhlas bertindak, dan budi pekerti/ akhlakul karimah merupakan pilar karakter anak usia dini terkait dengan hubungan ketuhanan sehingga menjadi fokus dalam penelitian ini.

METODE

Penelitian ini menggunakan pendekatan kuantitatif. Rancangan penelitian ini menguji dimensi karakter anak usia dini yang terkait dengan hubungan Ketuhanan. Lokasi penelitian di wilayah Daerah Istimewa Yogyakarta. Subjek penelitian ditunjukan pada Tabel 1.

Tabel 1
Subjek Penelitian

Kota/Kabupaten	Sekolah PAUD	Subjek
Bantul	6 PAUD	118
Kulon Progo	1 PAUD	18
Gunung Kidul	7 PAUD	117
Sleman	5 PAUD	86
Kota Yogyakarta	7 PAUD	112
Total	26 PAUD	451

Dimensi karakter anak usia dini yang berkaitan dengan hubungan ketuhanan terdiri atas 4 indikator meliputi keyakinan/ akidah (KA), rajin beribadah (RB), sikap ikhlas bertindak (SK), dan nilai budi pekerti/akhlakul karimah (BP). Instrumen pengumpulan data menggunakan lembar kuesioner yang diisi oleh guru. Instrumen tersebut digunakan untuk mengumpulkan data dimensi karakter anak usia dini berkaitan dengan hubungan ketuhanan. Instrumen tersebut memuat 12 butir pernyataan yang mengukur 4 indikator yaitu: KA terdiri atas 3 butir, RB terdiri atas 3 butir, SK terdiri atas 3 butir, dan BP terdiri atas 3 butir. Secara rincinya dintunjukkan pada Tabel 2.

Data kuantitatif yang diperoleh di-analisis dengan *confirmatory factor analysis (CFA)* dengan pendekatan second order. Penggunakan program *LISREL 8.50,* untuk memudahkan dalam proses analisinya. Kriteria yang digunakan untuk menyatakan model konstruk fit (kecocokan model) adalah *absolute fit indices, incremental fit indicies,* dan *persimonius* (Schermelleh-Engel, Moosbrugger, & Mueler, 2003; Hair, Anderson, Tatham, & Black 2010, pp. 578-581).

HASIL PENELITIAN DAN PEMBAHASAN

Data penelitian yang diperoleh dianalisis dengan *confirmatory factor analysis second order*. Proses analisis dilakukan sebanyak tiga kali yaitu analisis awal, reanalisis 1, dan reanalisis 2. Proses reanalisis 1 dilakukan karena pada analisis awal ditemukan ada butir pernyataan yang tidak memenuhi kriteria *loading* faktor (lebih besar atau sama dengan 0,5) dan konstruknya tidak memenuhi fit model. Begitu pula hasil reanalisis 1, masih ditemukan butir pernyataan yang tidak memenuhi kriteria *loading* faktor sehingga dilakukan reanalisis 2. Berdasarkan analisis awal diperoleh hasil seperti yang disajikan pada Tabel 3.

Tabel 2
Kisi-kisi Instrumen

Indikator	Pernyataan	No Butir
Keyakinan/ akidah	Percaya kepada kekuasaan Tuhan	1
	Percaya kepada nasib keadaan seseorang	2
	Percaya kepada adanya pertolongan orang lain	3
Rajin beribadah	Setiap hari anak berdoa kepada Tuhan	4
	Setiap hari anak beribadah sebagai perintah Tuhan	5
	Setiap hari anak beribadah tepat waktu	6
Sikap ikhlas bertindak	Anak menolong teman lain tanpa pamrih	7
	Anak tidak meminta imbalan ketika menolong orang lain	8
	Anak menolong orang/teman lain tanpa pilih kasih	9
Nilai budi pekerti/akhlakul karimah	Anak berbicara dengan tutur kata yang baik	10
	Anak tidak suka menyakiti teman/orang lain	11
	Anak bersikap sopan dan santun kepada orang lain	12

Tabel 3
Hasil Analisis CFA Second Order

Goodness of Fit	*Cut of Value*	*Value*	*Decision*
NFI	≥ 0,90	0,74	Tidak Baik
CFI	≥ 0,90	0,76	Tidak Baik
IFI	≥ 0,90	0,76	Tidak Baik
RFI	≥ 0,90	0,66	Tidak Baik
AGFI	≥ 0,90	0,69	Tidak Baik

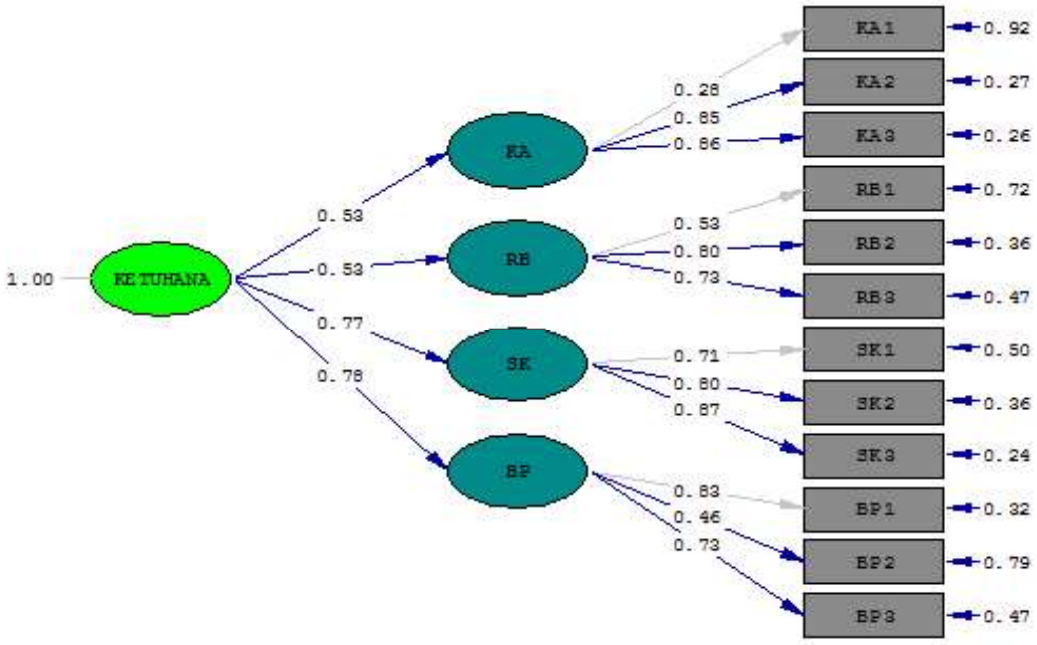
Tabel 3 menunjukkan bahwa keseluruhan persyaratan *goodness of fit* pada jenis *incremental fit* tidak terpenuhi, begitu pula pada jenis *absolute fit indices,* dan *persimonius* tidak terpenuhi, karena nilai yang diperoleh tidak berada dalam interval yang ditentukan, sehingga dikatakan bahwa model yang diperoleh adalah tidak fit. Karena model tidak fit maka dilakukan reanalisis 1.

Pada dimensi karakter anak usia dini terkait dengan hubungan ketuhanan memiliki 12 butir pernyataan. Berdasarkan *output standardized factor loading*, diperoleh butir KA2 (0,85); KA3 (0,86); RB1 (0,53); RB2 (0,80), RB3 (0,73); SK1 (0,71); SK2 (0,80); SK3 (0,87); BP1 (0,83); dan BP3 (0,73) > 0,5; sedangkan KA1 (0,37) dan BP2 (0,46) < 0,5. Hal ini, ditunjukkan dari diagram CFA *second order* berdasarkan *standar solution* pada Gambar 1 dan berdasarkan t_{value} pada Gambar 2.

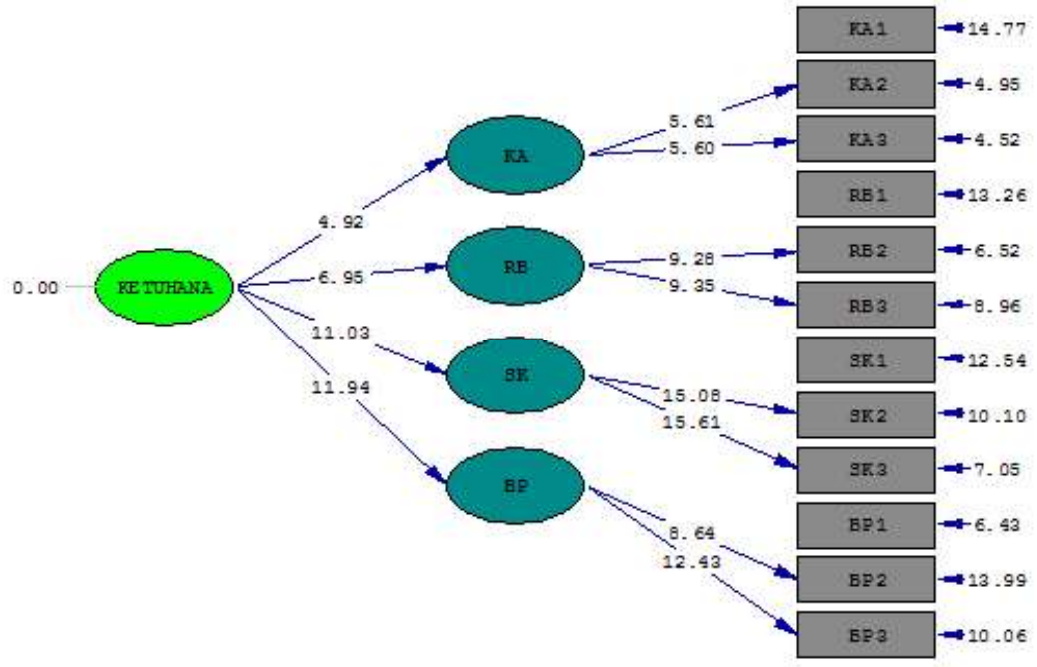
Berdasarkan nilai *loading* faktor dan nilai t_{value}, tampak bahwa hanya ada dua butir pernyataan yaitu KA1 dan BP2 yang tidak memenuhi kriteria. Hal ini, dapat dilihat dari t_{value} lebih kecil dari nilai t_{tabel} 1,96, sehingga diperoleh 10 butir yang memberikan kontribusi terhadap masing-masing indikator karakter anak usia dini terkait dengan hubungan ketuhanan.

Berdasarkan Gambar 1 dan Gambar 2, nilai *loading* faktor dari indikator KA (0,53); RB (0,53); SK (0,77); dan BP (0,78) > 0,5 dan nilai t_{value}-nya > 1,96. Artinya, setiap indikator memberikan kontribusi

Gambar 1. *CFA Second Order* Diagram *Based on Standardized Solution*



Gambar 2. *CFA Second Order Diagram Based on T-*$_{value}$



terhadap dimensi pendidikan karakter anak terkait dengan hubungan ketuhanan.

Reanalisis 1 dilakukan terhadap 10 butir pernyataan yang memenuhi kriteria nilai *loading* faktor. Berdasarkan reanalisis diperoleh hasil seperti yang disajikan pada Tabel 4.

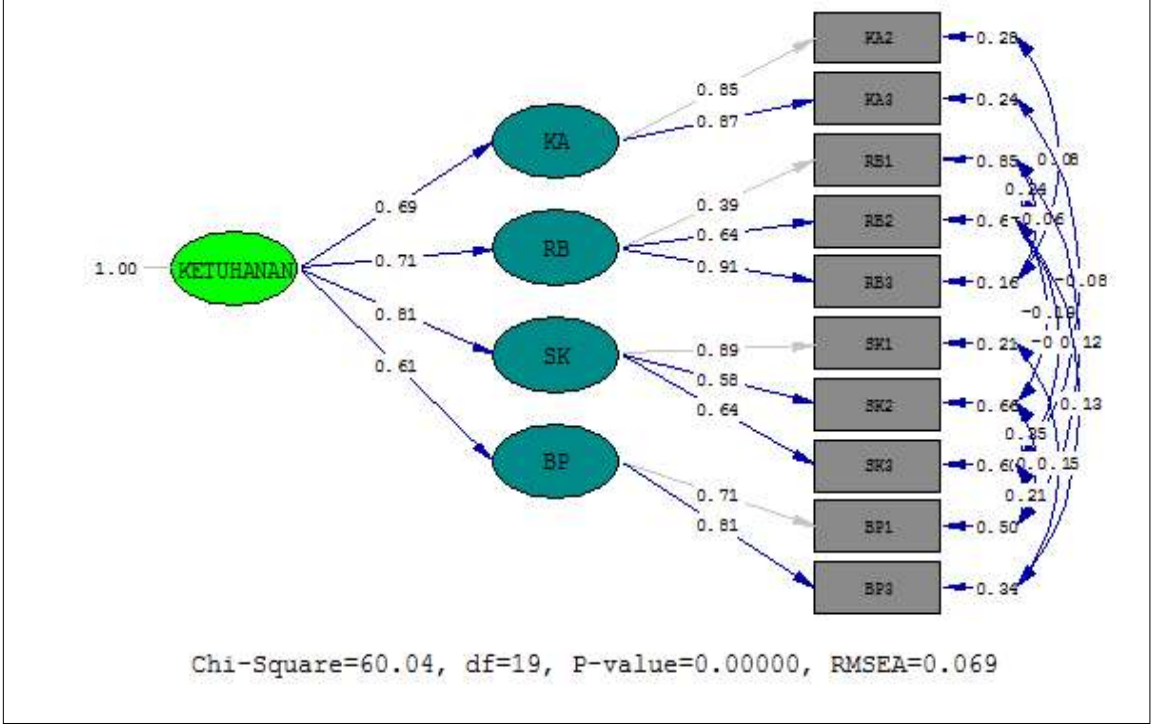
Tabel 4
Hasil Analisis CFA Second Order

Goodness of Fit	*Cut of Value*	*Value*	*Decision*
NFI	≥ 0,90	0,97	Baik
CFI	≥ 0,90	0,98	Baik
IFI	≥ 0,90	0,98	Baik
RFI	≥ 0,90	0,93	Baik
AGFI	≥ 0,90	0,92	Baik

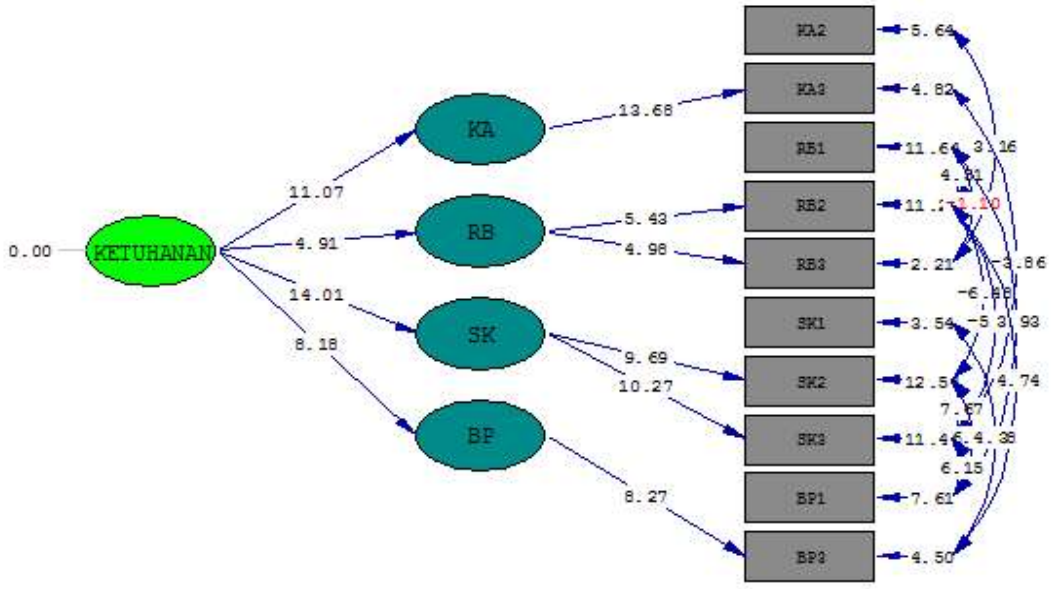
Tabel 4 menunjukkan bahwa keseluruhan persyaratan *goodness of fit* pada jenis *incremental fit* telah terpenuhi karena nilai yang diperoleh berada dalam interval yang diperlukan sehingga dikatakan bahwa model yang diperoleh adalah fit. Karena model fit, maka dimensi pendidikan karakter anak usia dini terkait dengan hubungan ketuhanan di keresidenan Yogyakarta terdiri atas: keyakinan/akidah (KA), rajin beribadah (RB), sikap ikhlas bertindak (SK), dan nilai budi pekerti/ akhlakul karimah (BP).

Dimensi karakter anak terkait dengan hubungan ketuhanan memiliki 10 butir pernyataan. Berdasarkan *output standardized factor loading*, diperoleh butir KA2 (0,85), KA3 (0,87), RB2 (0,64), RB3 (0,91), SK1 (0,89), SK2 (0,58), SK3 (0,64), BP1 (0,71), dan BP2 (0,81) > 0.5, sedangkan RB1 (0,39) < 0,5. Hal ini, dapat ditunjukkan dari diagram CFA *second order* berdasarkan *standard solution* pada Gambar 3 dan nilai t_{value} pada Gambar 4.

Gambar 3. *CFA Second Order Diagram Based on Standardized Solution*



Gambar 4. *CFA Second Order Diagram Based on T-value*



Nilai *loading* faktor dan t_{value}, menunjukkan bahwa hanya ada satu butir pernyataan yaitu RB1 yang merupakan butir dari indikator RB tidak memenuhi kriteria. Hal ini, dapat dilihat dari t_{value} lebih kecil dari nilai t_{tabel} 1,96 sehingga diperoleh 9 butir pernyataan yang memberikan kontribusi terhadap masing-masing indikator karakter anak usia dini terkait dengan hubungan Ketuhanan.

Pada Gambar 3 dan 4, nilai *loading* faktor dari indikator KA (0,69); RB (0,71); SK (0,81); dan BP (0,61) > 0,5 dan nilai t_{value}-nya > 1,96. Artinya, setiap indikator memberikan kontribusi terhadap dimensi pendidikan karakter anak usia dini terkait dengan hubungan ketuhanan.

Reanalisis 2 dilakukan karena masih terdapat butir yang belum memenuhi kriteria *loading* faktor meskipun konstruknya sudah memenuhi model fit. Berdasarkan reanalisis 2 diperoleh hasil seperti yang disajikan pada Tabel 5.

Tabel 5
Hasil Analisis CFA Second Order

Goodness of Fit	*Cut of Value*	*Value*	*Decision*
NFI	≥ 0,90	0,97	Baik
CFI	≥ 0,90	0,98	Baik
IFI	≥ 0,90	0,98	Baik
RFI	≥ 0,90	0,93	Baik
AGFI	≥ 0,90	0,92	Baik

Tabel 5 menunjukkan bahwa keseluruhan persyaratan *goodness of fit* pada jenis *incremental fit* telah terpenuhi karena nilai yang diperoleh berada dalam interval yang diperlukan, sehingga dikatakan bahwa model yang diperoleh adalah fit. Karena model fit maka dimensi pendidikan karakter anak usia dini berkaitan dengan hubungan ketuhanan di keresidenan Yogyakarta terdiri atas: keyakinan/akidah (KA), rajin beribadah (RB) butir, sikap ikhlas bertindak (SK), dan nilai budi pekerti/akhlakul karimah (BP).

Dimensi hubungan anak berkaitan dengan hubungan ketuhanan memiliki 9 butir pernyataan. Berdasarkan *output standardized factor loading*, diperoleh butir KA2 (0,88); KA3 (0,84); RB2 (0,58); RB3 (1,00); SK1 (0,94); SK2 (0,55); SK3 (0,61); BP1 (0,69); dan BP2 (0,83) > 0,5. Hal ini dapat ditunjukkan dari diagram CFA *second order* berdasarkan *standar solution* pada Gambar 5 dan t_{value} pada Gambar 6.

Loading faktor dan t_{value} menunjukkan bahwa tidak ada butir yang tidak memenuhi kriteria yang ditentukan. Hal ini dapat dilihat dari t_{value} lebih besar dari nilai t_{tabel} 1,96 sehingga diperoleh 9 butir yang memberikan kontribusi terhadap masing-masing indikator karakter anak usia dini terkait dengan hubungan ketuhanan.

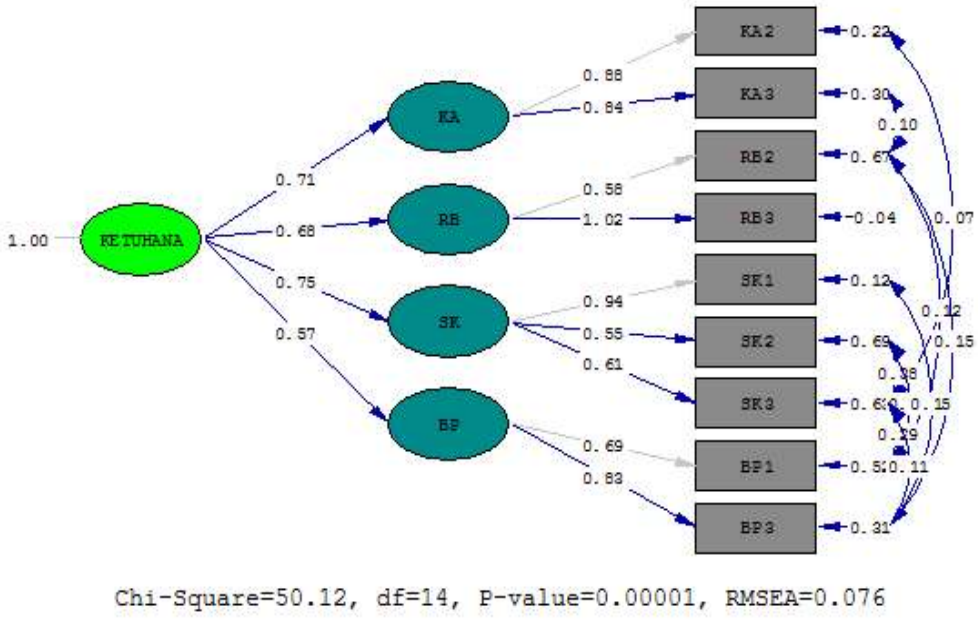
Gambar 5 dan 6 menunjukkan nilai *loading* faktor dari indikator KA (0,71); RB (0,68); SK (0,75); dan BP (0,57) > 0,5 dan nilai t_{value}-nya > 1,96. Artinya. setiap indikator memberikan kontribusi terhadap dimensi pendidikan karakter anak usia dini berkaitan dengan hubungan ketuhanan.

Pendidikan karakter anak usia dini yang dilaksanakan daerah penelitian sudah menanamkan nilai-nilai karakter yang berkaitan dengan hubungan ketuhanan. Nilai karakter yang ditanamkan yaitu keyakinan/akidah, rajin beribadah, sikap ikhlas bertindak, dan nilai budi pekerti/akhlakul karimah.

Sikap ikhlas bertindak adalah nilai karakter yang sangat menonjol pada anak usia dini yang berkaitan dengan hubungan ketuhanan. Hal ini ditandai dengan nilai loading faktor yang lebih besar. Sikap ikhlas bertindak ditunjukkan dengan sikap atau perilaku anak menolong teman lain tanpa pamrih, anak tidak meminta imbalan ketika menolong lain, dan anak menolong orang/teman lain tanpa pilih kasih.

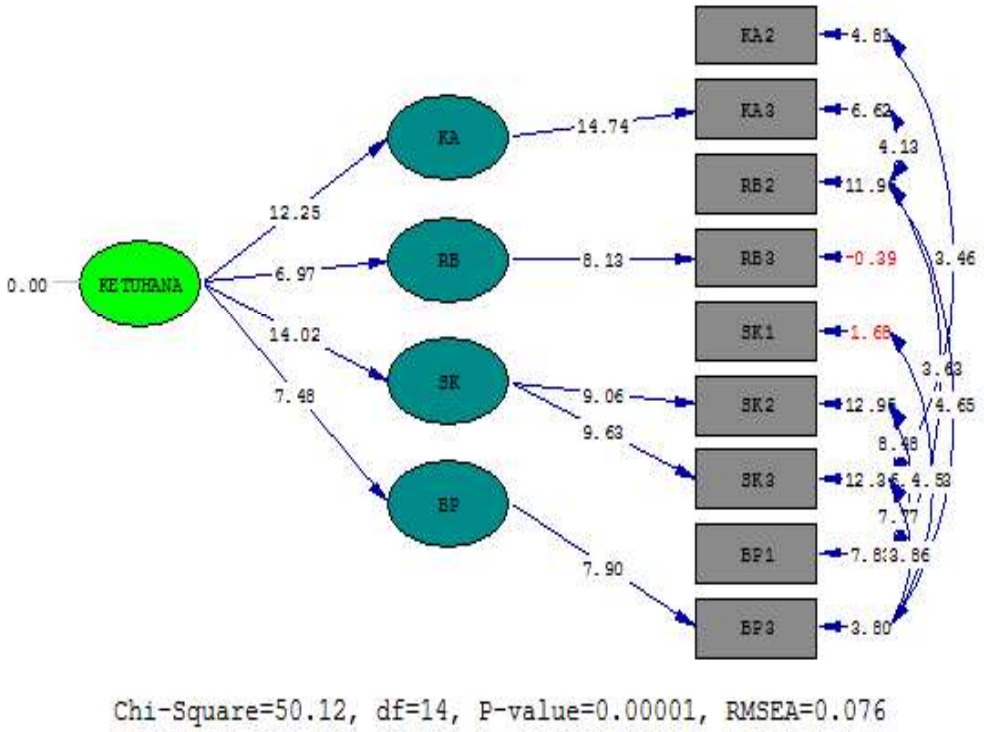
Keyakinan/akidah yang ditunjukan anak usia dini, sudah cukup baik meliputi percaya kepada kekuasaan Tuhan, percaya

Gambar 5. *CFA Second Order Diagram Based on Standardized Solution*



Chi-Square=50.12, df=14, P-value=0.00001, RMSEA=0.076

Gambar 6. *CFA Second Order Diagram Based on* $T_{\text{-value}}$



kepada nasib keadaan seseorang, dan percaya kepada adanya pertolongan orang lain. Hasil penelitian ini selaras dengan pendapat Desmita (2014, p. 279) yang menyatakan bahwa kepercayaan anak bersifat peniruan, karena kepercayaan yang dimilikinya masih merupakan gabungan hasil pengajaran dan contoh-contoh signifikan dari orang dewasa; dan gambaran tentang Tuhan diibaratkan sebagai seorang pribadi, orang tua atau penguasa yang bertindak dengan sikap tegas. Perilaku rajin beribadah yang ditunjukan juga sudah cukup baik meliputi setiap hari anak berdoa kepada Tuhan, setiap hari anak beribadah sebagai perintah Tuhan, dan setiap hari anak beribadah tepat waktu.

Budi pekerti/akhlakul karimah adalah nilai karakter yang belum menonjol pada anak usia dini yang berkaitan dengan hubungan ketuhanan. Hal ini ditandai dengan nilai loading faktor yang lebih kecil. Budi pekerti/akhlakul karimah ditunjukkan dengan sikap atau perilaku anak berbicara dengan tutur katan yang baik, dan anak bersikap sopan dan santun kepada orang lain.

Bertalian dengan karakter yang dimiliki seorang anak dalam pandangan Islam, Sopiatin dan Sahrani (2011, pp. 99-101) menyatakan bahwa fase kehidupan di dunia dalam perspektif islam adalah sebagai berikut. *Pertama,* bayi (*at-thif*). Usia bayi berkisar sejak lahir sampai dua minggu tidak memiliki kemampuan apapun yang ada hanya *hidayah insting*. *Kedua,* islam. Anak-anak yang belum cukup usia *(shaby*). Usia dua minggu sampai tujuh tahun sudah punya perasaan ketuhanan, perilakunya dipengaruhi oleh yang dilihat,

didengar, dan stimulus campuran. *Ketiga,* aqil (*mumayyiz*). Anak yang telah berakal usia tujuh tahun sampai sembilan tahun mampu membedakan baik dan buruk menurut pandangan logika. *Keempat,* awal *adolense* (*murahiq*). Remaja awal usia sembilan tahun sampai sebelas tahun mulai mencari teladan untuk dijadikan idola. Hal ini menunjukkan bahwa ada empat fase yang dilalui seorang anak. Pada fase aqil anak sudah mulai dapat membedakan baik dan buruk.

Dalam konsep pendidikan karakter menurut ajaran agama islam bahwa budi pekerti/akhlakul karimah merupakan nilai karakter yang sangat ditekankan kepada setiap anak. Sebagaimana terdapat dalam Al-Hadis yang berbunyi "Sesungguhnya Allah itu adalah Zat Yang Mahamulia, karena itu dicintai-Nya kemuliaan, juga budi pekerti luhur dan benci pada akhlak yang hina (HR Abu Na'im dari Sahal ibn Sa'ad)".

Berdasarkan hal tersebut, pendidikan karakter anak usia dini berkaitan dengan penanaman nilai budi pekerti/akhlakul karimah perlu ditingkatkan baik pada lembaga formal, nonformal, dan atau informal. Pelaksanaan pendidikan karakter harus dengan penuh kehati-hatian. Karena anak usia dini adalah anak yang ada dalam tahap perkembangan pra-operasional konkrit, sementara nilai-nilai karakter merupakan konsep yang masih abstrak, sehingga dibutuhkan metode yang tepat dan efektif dalam menanamkan nilai-nilai karakter kepada anak (Wibowo, 2013, p. 51).

Pendidikan karakter dapat dilakukan melalui tiga desain sgar dapat berjalan efektif. *Pertama,* desain berbasis kelas, yang berbasis pada relasi guru sebagai pendidik dan anak sebagai pembelajar. *Kedua,* desain berbasis kultur sekolah, yang berusaha membangun kultur sekolah yang mampuh membentuk karakter anak dengan bantuan pranata sosial sekolah agar nilai tertentu terbentuk dalam diri anak. *Ketiga,* desain berbasis komunitas (Asmani, 2011, p. 155).

Supartinah, Kawuryan, dan Hastuti, (2018) menyatakan bahwa anak membutuhkan cara khusus dalam memahami pendidikan karakter sesuai dengan usia perkembangannya. Oleh karena itu, internalisasi pendidikan karakter di setiap mata pelajaran di sekolah PAUD menjadi hal yang penting. Untuk menanamkan karakter positif pada anak, pendidikan karakter harus dilakukan secara terus menerus hingga menjadi kebiasaan yang terus dipraktikkan dan dilakukan (Solihati, Hikmat, Jupri, & Hidayatullah, 2019).

Demensi pendidikan karakter anak yang berkaitan dengan hubungan ketuhanan merupakan hal yang sangat penting, karena ini merupakan dasar dalam berprilaku mulia atau berbuat baik. (Azzet, 2011, p. 68) menyatakan bahwa tanda yang paling penting bagi seorang anak dalam beragama dengan baik adalah apabila mampuh mengamalkan ajaran agama yang dianutnya dalam kehidupan sehari-hari.

Pembinaan atau penanaman nilai-nilai karakter anak usia dini terkait dengan hubungan ketuhanan dilakukan sejak dini maka akan memberikan dasar-dasar pembentukan karakternya. Apabila anak telah terbiasa berbuat baik maka akan tertanam rasa itu kedalam jiwanya dan menjadi kontrol pribadi terhadap sikap dan perbutannya.

SIMPULAN

Berdasarkan hasil analisis data, dan pembahasan dapat ditarik kesimpulan sebagai berikut. *Pertama*, dimensi pendidikan karakter anak usia dini terkait dengan hubungan ketuhanan di sekolah PAUD yang ada di Daerah Istimewa

Yogyakarta terdiri atas: keyakinan/akidah, rajin beribadah, sikap ikhlas bertindak, dan nilai budi pekerti/akhlakul karimah. Nilai-nilai karakter tersebut dapat dijadikan sebagai kekuatan karakter anak dalam kehidupan sehari-hari. *Kedua*, nilai sikap ikhlas bertindak merupakan faktor (indikator) dominan pada pendidikan karakter anak usia dini di PAUD yang ada di Daerah istimewa Yogyakarta. *Ketiga*, nilai budi pekerti/akhlakul karimah merupakan faktor (indikator) kurang dominan pada pendidikan karakter anak usia dini di PAUD yang ada di Daerah Istimewa Yogyakarta.

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DESIGNING OF LEARNING ACTIVITY FOR EXPLICATING NATURE OF SCIENCE

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Abstract

This study was aimed at clarifying the learning activities for explicit Nature of Science (NOS) which provide through context based STS (Science, Technology, Society) learning approach. The study followed the 4-D procedure but in this article only was presented up to the third step. These steps included define, design, and develop. The data were gathered through expert judgment by chemistry educator for product revision. The views of the chemistry teacher were explored through a closed-questionnaire that was analyzed by percentage. One of learning activity plan have arranged. The learning activity with context based STS approach consists of 5 stages including identification of social issues/history, identification of potential solution, need for knowledge, decision-making, and socialization and completion decision stage. Chemistry teachers' view toward the feasibility of learning activity plan was good. The learning activity was developed with topic a history of the Father of Modern Chemistry for grade 10th. The findings show thatt his learning activity is able to help teacher for teaching NOS in classroom and foster students' NOS through a historical story.
Keywords: *basic law of chemistry, nature of science, learning activity*

INTRODUCTION

One of the 21st skills demand is to have scientific literacy. The scientific literacy is commonly defined as the ability to critically analyze and evaluate the information of the scientific ideas and concepts required for personal decision-making in the daily life situations (Jarman & McClune, 2007; OECD, 2015; Shwartz, Ben-Zvi, & Hofstein, 2006; Cigdemoglu, Arslan, & Cam, 2017). However, the study conducted by the Programme for International Students Assessment (PISA) shows that Indonesian students' scientific literacy is very low compared to other countries. In 2012, Indonesian Students Scientific Literacy was in the 64th rank out of the 65 countries listed. In 2015, Indonesian Students Scientific Literacy was in the 62nd rank out of the 70 countries listed. In 2018, Indonesian Students Scientific Literacy was in the 70th rank out of the 78 countries listed.

One of the prominent aspects of scientific literacy is Nature of Science (NOS). Numerous studies revealed that a proper understanding of the NOS is essential for scientific literacy and that NOS can be learned best by the explicit approach (Abd-El-Khalick & Lederman, 2000a; Donovan-White, 2006; Khishfe & Abd-El-Khalick, 2002; Lederman 2007; McComas, 2000). Allchin (2004) stated that *"basic scientific concepts provide a framework. But one must also know about science – how research is pursued, how conclusions are justified, even how scientists may sometimes error be shaped by cultural biases"*. Many science education documents such as the American Association for the Advancement of Science and the National Research Council emphasize an important role in

improving students' understanding of NOS. NOS is important because it is needed to make, manage and process scientific and technological objects, inform decision making on socioscientific issues, respect the value of science as a culture of the present, NOS develop an understanding of the norms of the scientific community to realize a moral commitment that is of general value to the community and facilitating the subject matter of science learning (Hardianty, 2015).

In fact, for many science teachers, fruitful educating of NOS is demanding. Also for chemistry teacher since they should introduce NOS for grade X students while teaching nature of chemistry and scientific method as. That is the first matter for chemistry learning in senior high school. However, science teachers frequently do not really have adequate comprehension of NOS, and in any event, having such a comprehension does not ensure students' learning of NOS (Lederman, 2007). Notwithstanding an adequate comprehension of NOS, teachers additionally need to have reasonable instructive aptitudes and substance information to train NOS and they have to appreciate NOS as a learning objective (Lederman, 1999). Teacher also need to make a reasonable plan to be success in teaching NOS. Regarding to that issue, learning activity that can help teacher for teaching NOS in classroom and could foster students' NOS is needed to develop.

The phrase "nature of science" commonly alludes to the epistemology of science, science as a method of knowing, or the values/qualities and convictions inborn to the development of scientific knowledge (Lederman, 1992, 2007). Beyond these general portrayals, no agreement directly exists among scholars of science, antiquarians of science, researchers, and science teachers on a particular definition for NOS. This absence of agreement, in any case, should not be perplexing nor astonishing given the multifaceted nature and unpredictability of the logical attempt. Conceptions of NOS have changed all through the improvement of science and orderly contemplating science and are reflected in the manners the logical and science instruction networks have characterized the expression "nature of science" during the previous 100 years (e.g., AAAS, 1990, 1993; California Department of Education, 1990; Center of Unified Science Education at Ohio State University, 1974; Central Association for Science and Mathematics Teachers, 1907; Klopfer & Watson, 1957; NSTA, 1982).

Lederman, Lederman, and Antink (2013) suggested that there are seven aspects of the NOS that are noncontroversial and accessible to K-12 students and which are also considered to be relevant to their daily lives: scientific knowledge is tentative (subject to change); empirically-based (based on and/or derived from observations of the natural world); subjective and/or theory-laden; partly the product of human inference, imagination, and creativity (involves the invention of explanation); socially and culturally embedded; the distinction between observations and inferences, and the function of, and relationships between scientific theories and laws.

METHOD

This study followed Four-D Model (Thiagarajan, Semmel, & Semmel, 1974) in designing the learning activity. There were four steps covered Define, Design, Develop, and Disseminate but this study just reported till Develop step.

Define step started by searched relevant literatures and conducted initial interview with chemistry teacher about teaching NOS in senior high school. The result showed

that teaching NOS mostly was implemented by context-based learning; inquiry; and Science, Technology, and Society (STS) approaches. Also, chemistry teachers still have not introduce about NOS explicitly during chemistry learning since many difficulties. These difficulties included ways to integrated NOS with chemistry topics/ matters and used appropriate strategy.

Design step conducted by arranged of learning activity design based on result of Define step. Design included chosen learning approach for developing learning activity namely context-based (STS) that founded by Yuenyong (2006) and chemistry topic scope of eleventh grade namely Nature of Chemistry and Scientific Method (Regulation of Indonesian Ministry of Education and Culture Number 37 Year 2018).

In the Develop step, learning activity design was described in five steps regarding to the features of context-based STS. The description give guideline the activities that should conduct by students and teacher in explicating NOS. The learning activity was developed with topic a history of the Father of Modern Chemistry for grade 10^{th}.

Data collection was carried out in two stages, namely expert judgment and questionnaire. Expert's suggestions were related to the construct accuracy of the context-based STS, the accuracy of the concept, grammar and writing. These suggestions were used to revise the learning activities. Meanwhile, the questionnaire was used to determine the feasibility of a learning activity according to the chemistry teacher view as a potential user. The closed questionnaire consists of 10 statements which represent two aspects, namely, feasibility in terms of content and feasibility in terms of language. The questionnaire consists of three alternative choices i.e. good, moderate, and less good.

Expert suggestions data was only processed qualitatively by mapping the types of suggestions and used as a basis for improving learning activities. The questionnaire data from 10 chemistry teachers were analyzed quantitatively by percentage.

RESULT AND DISCUSSION

The lesson plan of Nature of Science NOS learning activity was developed on the concept of Context-based STS learning approach which the NOS learning activities should provide not only the ways of investigation and solving problem but also a real-world problem-solving. Besides, this learning activity was organized for explicit NOS through a historical story. Regarding Yuenyong (2006), the context-based STS learning approach consists of 5 stages included identification of social issues, identification of potential solution, need for knowledge, decision-making, and socialization and completion decision stage. The lesson plan could be provided in Table 1.

This lesson plan is designed for 10^{th} graders who are taking up Natural Sciences Interest. Each class will be divided into some groups and each group will be tasking themselves in the solving of problems.

Stage 1. Identification of Social Issue/ History. In this stage, the teacher provides a history of the Father of Modern Chemistry (see Figure 1). Furthermore, the teacher asks students to identify the history in the worksheet.

Upon identifying the history, the teacher will ask some questions. In this case, the questions are divided into three parts. That is NOS reflective questions, content questions, and social questions. NOS reflective questions aim to enhance students' NOS. Meanwhile, content questions purpose to identify students' conceptual understanding. Furthermore,

Table 1
Nature of Science Learning Activity Adapting the Context-based STS Learning Approach

No	Step	Activity
1	Identification of social issues/history	The teacher provides a history of the Father of Modern Chemistry; The teacher asks students to identify the history in the worksheet; Students discuss history about Law of Conservation Mass as the invention of the Father of Modern Chemistry; Teacher raises issue by questions. *NOS's reflective questions:* (a) In your opinion, could the Scientist such as Lavoisier declare a law/theory without evidence? Explain your answer **(scientific knowledge demands eviden-ce);** (b) In your opinion, could the existing knowledge such as the Law of Mass Conservation change in the future? Explain your answer **(tentativeness of scientific knowledge)**; (c) In your opinion, why the invention of Lavoisier was categorized as law? Could that invention be categorized as a theory? Explain your answer **(laws and theories are a different kind of knowledge)**; (d)The scientific method was conducted by Lavoisier different from the scientific method was conducted by Joule. Even though, the principle of their invention was quite similar. What extend do you agree or disagree? Explain your idea **(scientific method (no universal scientific method))**; (e) What are the roles of observation in science?; (f) What are the roles of inference in science? **(developed from a combination of observation and inferences)**; (g) Lavoisier needed the imagination to discover the Law of Mass Conservation. What extend do you agree or disagree? Explain your idea **(partly the product of inference, imagination, creativity).** *Content's questions:* What will happen when you try to burn wood in a closed glass container? Does the mass of wood change after the burning process? Explain your answer. *Society's questions:* Waste is one of the major problems in society. The most number of waste in society is plastic waste. What is your idea to solve the problem? If we have 10-kilogram plastic waste especially PP or PE can you change the plastic waste to be a reasonable product with the same mass? Explain your idea
2	Identification of potential solutions	Students work in a group to discuss the questions Each group identifies the possibility to answer the questions
3	Need for knowledge	To get the answer, students need to gather related information; The teacher asks students to collect any information from various learning resources; The teacher also asks students to conduct a small experiment related to the law of mass conservation (students burn wood in a closed glass container, students observe the mass of wood before and after the burning); Based on the information gathered, now the students have many considerations to build their idea to answer the question.
4	Decision making	Each group determines its answer; Example of students' answer: *NOS's reflective questions answer*: (a) No, it cannot. A scientist has to have evidence to declare a law/theory because scientific knowledge demands evidence; (b) Yes, it can. Science is dynamic. It can be changed if there is more acceptable knowledge due to the tentativeness of scientific knowledge; (c) No, it cannot. The invention of Lavoisier is the law. It cannot be categorized as a theory. Law and theory are a different kind of knowledge. Law is a statement/description of an observed phenomenon without explaining what is the cause of the phenomenon. Meanwhile, the theory explains that phenomenon; (d) I agree with the statement. Each scientist has a scientific method because there is no universal scientific method; (e) Observation is a prominent activity in science. Observations are descriptive statements about natural phenomena that are "directly" accessible to the senses and about which several observes can reach consensus with relative cases (Lederman, *et al.*, 2013); (f) The inference is another prominent activity in science. Inferences go beyond the senses (Lederman, *et al.*, 2013); (g) I agree with that statement because chemistry is not only about the macroscopic level, but also the microscopic level. Hence, imagination is needed in science, especially chemistry. *Content's questions answer:* Based on the result of the experiment, the mass of wood in the closed container glass before and after the reaction is the same. It is appropriate with the Law of Mass Conservation. *Society's questions answer:* One of the solutions to deal with these issues is making plastic waste to be a more valuable product. Plastic waste, especially PP or PE can make to be an alternative fuel with a simple instrument. The number of plastic the same as the number of alternative fuels. For instance, if we have 10-kilogram plastic waste, we will have 6 Liter diesel fuel; 2,5 Liter gasoline; 1,5 Liter kerosene. It means "The mass of the substance before the reaction, the same as the mass of the substance after the reaction". The result is appropriate with the Law of Mass Conservation. Furthermore, the process of the change from plastic waste to be some alternative fuels also can relate to the Law of Energy.
5	Socialization & completion	Each group presents their answer and defenses it in classroom discussion; Students share their final result in social media, for example, Instagram, Facebook, youtube, etc

Figure 1. The History of the Father of Modern Chemistry

Father of Modern Chemistry: A Law Scholar who discovering the Law of Mass Conservation

Antonie Laurent Lavoisier is a man who grew up from a prosperous family. He was born on August 26, 1743, he had to separate from Mary Poras, his mother because she died when he was 5 years old. His father was a lawyer in the parliament of Paris, France. Since he was a child, Lavoisier has had a high interest in science. However, like other people who are "lost", he chose to pursue law faculty at the age of 18 years old. The reason was his father. He wanted to be a famous lawyer like his father. On the other hand, his love of the world of science kept him learning continuously. Finally, his hard work paid off. In 1789, Lavoisier shocked the world of chemistry. Yes, the chemical world. Not the world of law as he formally worked on. In those years, the chemistry was still classified as "Classical Chemistry". At that time, the developing chemical theories still questioned: "water that would become a residue if it was heated continuously." At that time, scientists thought that by heating water, over time the water would turn into soil. And at the same time, Lavoisier explained the results of his research at Traité Elémentaire de Chimie. He tried to react to the mercury liquid with oxygen gas in a container in a closed room to produce red mercury oxide. If the mercury oxide is reheated, the compound will decompose to produce the same amount of mercury liquid and oxygen gas. By these results, Lavoisier's Law emerged. It was well-known as the Law of Mass Conservation. "The mass of the substance before the reaction, the same as the mass of the substance after the reaction" This research instantly changed the period of "Classical Chemistry" to a new era: Modern Chemistry. This concept is the basis of basic chemical laws. Lavoisier was named the Father of Modern Chemistry. In principle, the law of mass conservation is quite similar to the Law of Energy Conservation that was invented by James Prescott Joule that is "more familiar" in which energy can only change, without being able to be created or removed. The Law of Mass Conservation proves that the mass of matter in the world has never changed. One thing to remember in this law is that the system must be closed. If you boil, or burn, or react to an ingredient in an open container, the mass will not be the same. This law of conservation of mass can only be used for things like that. Just because you know this theory, you can't get into a glass container, then eat a lot. Continue to hope that the weight won't go up. The Law of Conservation of Mass discovered by Lavoisier is one of several basic chemical laws.

Translated and Adapted from Kresnoadi (2019)

society questions aim to know how students solve problems in their daily life. *Stage 2. Identification of Potential Solution.* In the second stage, the teacher facilitates the class discussion about thinking of potential solutions to answer all questions in three aspects. Each group identifies the possibility to develop their answers.

Stage 3. Need for Knowledge. In the third stage, the teacher facilitates students to gather any information from various learning resources related to the law of mass conservation. Students can collect information from books, journals, or other articles on the internet. Besides, students need to conduct a small experiment for answering the content's question. Furthermore, students need to conduct a small project to solve the problem in society.

Stage 4. Decision-making. In the fourth stage, each group decides its answers. After that, they present their answers and defense it in the classroom. The example of students' answers is provide below.

NOS's reflective questions answer. *First*, No, it cannot. A scientist has to have evidence to declare a law/theory because scientific knowledge demands evidence. *Second*, Yes, it can. Science is dynamic. It can be changed if there is more acceptable knowledge due to the tentativeness of scientific knowledge. *Third*, No, it cannot. The invention of Lavoisier is the law. It cannot be categorized as a theory. Law and theory are a different kind of knowledge. Law is a statement/description of an observed phenomenon without explaining what is the cause of the phenomenon. Meanwhile, the theory explains that phenomenon. *Fourth*, I agree with the statement. Each scientist has a scientific method because there is no universal scientific method. *Fifth*, Observation is a prominent activity in science. Observations are descriptive statements about natural phenomena that are "directly" accessible to the senses and about which several observes can reach consensus with relative cases (Lederman, *et al*., 2013). *Sixth*, The inference is another prominent activity in science. Inferences go beyond the senses (Lederman, *et al.*, 2013). *Seventh*, I agree with that statement because chemistry is not only about the macroscopic level, but also the microscopic level. Hence, imagination is needed in science, especially chemistry.

Content's questions answer. Based on the result of the experiment, the mass of wood in the closed container glass before and after the reaction is the same. It is appropriate with the Law of Mass Conservation.

Society's questions answer. Plastic waste, especially PP or PE can make to be an alternative fuel with a simple instrument. The number of plastic the same as the number of alternative fuels. For instance, if we have 10-kilogram plastic waste, we will have 6 Liter diesel fuel; 2,5 Liter gasoline; 1,5 Liter kerosene. It means "The mass of the substance before the reaction, the same as the mass of the substance after the reaction". The result is appropriate with the Law of Mass Conservation. Furthermore, the process of the change from plastic waste to be some alternative fuels also can relate to the Law of Energy.

Stage 5. Socialization and Completion Decision Stage. In the last stage, students have to present the result of their discussion in the classroom. Furthermore, students also have to share the result in social media, for instance, Instagram, Facebook, youtube, etc.

This learning activity could assist the teacher in teaching NOS in the classroom and could improve students' NOS through a historical story. Students who utilize the two NOS historical short stories had a significantly better understanding of the NOS concepts, compared to the students in the control group (Smith, 2010). The study of William and Rudge (2019) also revealed that the introduction of historical stories of science helped students achieved a better understanding of the role of imagination and creativity in science.

Quantitatively, for the aspect of language feasibility, all teachers (100%) stated that the product had a good criteria. Meanwhile, for the aspect of content feasibility, 9 teachers (90%) said it was good and 1 teacher said it was in moderate criteria. Some suggestions given by the teacher for improving the learning activity plan were providing the related links (e.g. video or the other resources), so students can study by themselves, providing the instruction of experiment to drive students, pushing

students to conduct the other experiments to prove the content, and providing the video for apperception.

Teacher recommendations are considered to improve the learning activity plan before it is implemented in class. With the activity of adding videos, especially contextual ones, it will attract students' interest as well as curiosity. On the other hand, the selection of animation-based videos makes it possible to expand students' knowledge of how scientists think. This is important as the cultivation of NOS values which are beneficial for the development of students' thinking patterns and mental learning. Moreover, hand on activity through real experiments in the laboratory will further strengthen students' scientific understanding and skills. A good support in introducing NOS to students.

CONCLUSION

This paper shared the ideas of developing NOS learning activities regarding Yuenyong (2006) context-based STS learning approach. The 5 stages of Yuenyong (2006) context-based STS teaching approach could guide ideas of developing learning activities from history to enhance students' NOS. This learning activity will allow students to understand NOS. Furthermore, students will have the opportunity to solve a problem in society. Since this lesson plan has not been implemented yet in a school setting, for future work it could be implemented. Hence, the effect of the implementation of this NOS learning activity can be measured empirically.

Acknowledgements

I would like to thank Khon Kaen University, Thailand who has given full support so that this paper can be realized.

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