

ISSN 2332-3213

Volume 7 Number 9A 2019

Special Edition on Education 4.0 and Beyond (Part A)



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Universal Journal of Education Research

Horizon Research Publishing, USA

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Journal Title: Universal Journal of Educational Research

Journal's Homepage: http://www.hrpub.org/journals/jour_info.php?id=95

Publisher: Horizon Research Publishing Co.,Ltd

Address: 2880 ZANKER RD STE 203, SAN JOSE,CA 95134, USA

Publication Frequency: monthly

Electronic Version: freely online available at http://www.hrpub.org/journals/jour_info.php?id=95

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Editor's Preface

Dear readers and contributors,

Recently, the student learning received considerable attention from the researchers. Learning is an important aspect of student's life. Many theories have been evolved on student learning mechanisms in past two decades. There are 5 overarching paradigms of educational learning theories; cognitivism, behaviourism, design/brain-based, constructivism, humanism and 21st Century skills. Recent technological development largely reshaped the existing understanding on the student learning theories and practices. The researchers have investigated how technology advancement, class room setting and teaching methodology influence the student learning process. Recently, the teaching methodologies have been shifted from teacher centred learning to student centred learning. The concept of education 4.0 altered existing practices of teaching and learning.

This special issue documented research work related to the education and learning in the modern age. The main aim of the special issue is to highlight current practices of teaching and learning in the education section of south east Asia in order to provide the future agenda for the educationist. Also this special issue contributed to enhance our current understanding of student learning mechanisms through deep rooted research. Studies mainly composed of primary data using both cross-sectional and longitudinal methodologies. We hope the readers will like our efforts to bring these new students learning concept to your knowledge.

The articles included in this special issue were presented in the 3rd ASIA International conference 2019, Universiti Teknologi Malaysia, Johor Bahru Malaysia on 1 May 2019 under the theme of Education 4.0 and beyond. More than 1000 articles were presented in this conference held at Universiti Teknologi Malaysia and selected articles were given opportunity to be submitted for possible publication in Universal Journal of Educational Research. There were 78 papers submitted for possible publication and after rigorous review process, 22 papers were selected for publication in this special issue. We are really thankful to the reviewers who willingly spent their time to provide their precious inputs in improving special issue quality. We also obliged the journal editor who provided us opportunity to publish special issue of AIMC 2019.

I would like to thank the journal editor, all the journal team and the authors in your peace of mind.

Kind Regards,

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Promoting of Masohi's Altruism Values through Social Studies Learning for Balance Social Ecology

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract This study aims to promote and preserve the values of Masohi altruism. The values contained in Masohi's altruism work together and please help. This study uses a classroom action research method with three cycles. The introduction of Masohi's local wisdom values as part of social studies is very much needed to preserve the local culture that is owned. This research was conducted in class VII in two Ambon City Public Middle Schools. Data collection is done by interviews, observations, documents, and preservation of local wisdom questionnaires. The collected data was analyzed using quantitative descriptive statistics. The results of the study indicate that learning with the values of Masohi altruism can enhance students' understanding of Masohi culture and maintain social ecological balance.

Keywords Altruism, Masohi, Ecological Social, PT

1. Introduction

Social studies learning must be able to improve life skills in facing the challenges of the 21st century. The 21st century is marked by the rise of easily accessible information, faster computing, automation, communication that can be accessed from anywhere and anytime [1].

The ease of information accessed and widely spread has an impact on the development of student intelligence. Students more easily copy the information they receive without considering it will have negative or positive consequences. IPS teacher demanded not only to be able to teach and manage classes, but must be able to be able to build effective relationships with students and schools and make improvements to learning continuously [2].

Social studies learning is currently still focused on textbooks and teacher-centered. The teacher must change the theoretical way of teaching to be practical. 21st century learning emphasizes student-centered learning and builds

interactions between students and interactions between students and teachers. 21st century learning is integrated with life skills and develops student problem solving skills [3].

The implementation of social studies has not yet adopted the local cultural superiority and wisdom. In learning activities students are not given the opportunity to develop student interests and give attention to local cultural inheritance and environmental use. It is important to encourage young people to acknowledge and be proud of their local wisdom and participate in their own local budayan preservation [4]. Social studies teachers must play a role in developing and preserving local wisdom.

The city of Ambon is the capital of the Maluku Province located inside the beautiful bay of Ambon, and is often also called Amboina. Ambon is a multicultural city but has similarities in cultural values. One of the cultures of Maluku is the values of Masohi mutual cooperation. Social values must be preserved to strengthen the unity and unity of the nation.

Gotong-royong is a system of mobilizing additional personnel from outside the family, to fill the shortage of energy during busy periods in the circle of production activities in the fields. [Koentjaraningrat, 1974]. In mutual cooperation, there is cooperation between many people to work on something that cannot be done by one person [Notonegoro, 1974]. With mutual cooperation, the heavy work becomes lighter and faster.

Recalling the history of the resistance of the Moluccan people (Islam and Christianity) to invaders in the Hutuhaha war with the spirit of unity and unity through mutual cooperation between the people of Maluku, they work hand in hand against imperialism and colonialism. With the spirit of mutual cooperation Indonesia can be independent.

Mutual cooperation was also carried out by Maluku people in building houses of worship, Sarani (Christian) groups felt obliged to prepare building materials and jointly build mosques. Likewise the Salam group (Islam) does the same thing. With the existence of mutual cooperation

Masohi can strengthen mutual respect for religious differences between the two groups and can prevent conflict and unite citizens. Mutual cooperation can strengthen solidarity. (Rolitia, M., Achdiani, Y., Eridiana, W).

Along with the modernization of the values of Masohi mutual cooperation, it began to fade because it was dominated by the capitalists. In certain indigenous communities, the meaning of mutual cooperation is still a glue and a unifying symbol. In urban communities, masohi is present only as a formal symbol designed for certain interests. Urban communities carry out masohi not because of inner and voluntary awareness, they do masohi because of pressure from the authorities and forced. Masohi is dominated by the middle to upper class economic community.

Teachers as professional educators are required to be able to interact with students in learning, as evaluator administrators and chancellors and teach life values to students. To introduce and preserve Masohi's values to students, an active role for teachers in social studies is needed at school.

Masohi is one of the national assets that must be preserved. The values of masohi altruism can be used as a source of social studies learning in junior high schools. From the results of interviews with several social studies teachers in three Ambon City Public Middle Schools, it can be concluded that they have never integrated the values of Masohi altruism as a source of learning. According to [5] culture itself must be accustomed to learning.

The curriculum used in the schools where the research was conducted was K-13. The K-13 curriculum actually includes local culture in social studies learning to provide breadth in providing material. At present the two schools where the research is conducted have never integrated and developed material about Maluku's local culture in social studies. This happens because the teacher does not understand the implementation of local culture in social studies learning. Facing existing problems, social studies learning in junior high schools needs to be improved in teaching materials and solutions that value Masohi altruism which is the local culture of the city of Maluku.

Masohi as one of the local cultures of the city of Maluku has its own position and value in the eyes of the community and students. The values of public altruism can be used to develop social studies learning materials that are related to the development of mutual cooperation values that students need to have in community, national and state life. The noble values possessed by Masohi local culture can be used as teacher reference sources to be developed in delivering learning material. In addition, it can be used to strengthen national culture, so that it can fortify students from the negative influence of the millennial era. The success of the teacher in instilling the values of Masohi altruism in social studies learning can provide students with an understanding of their attitude and behavior in accordance

with the values in Masohi culture and also to preserve the local culture in the student environment. According to [6] local culture can be a tool and process to support students learning from what is available locally.

The wisdom of the local culture of the community that is owned by various indigenous communities, ethnic groups, being effective on a local scale to prevent various damage and environmental problems in the local context is even effective in solving problems on a wider scale [7]. The values contained in Masohi culture require Maluku people to always behave in maintaining social ecological balance. Social ecology emphasizes the structure of the inner city, how parts of the city function with each other such as occupation, service, culture and experience in parts of the city [8].

2. Literature Review (Heading 1)

2.1. Values of Masohi Altruism

[9] defines *altruism* as a voluntary act carried out by a person or group of people to help others without expecting anything in return (except perhaps feeling has done good). [10] explains that *altruism* is a motivation to improve the welfare of others without being aware of one's personal interests.

The aspects contained in the values of altruism are cooperation, sharing, helping, giving, and honesty [11]. These values are in line with 21st century learning which emphasizes collaboration to minimize unfair competition. The values of altruism can be trained because in life humans have experiences that guide their lives [12].

Altruism is important as a support for the development of community relations. The act of altruism can occur in togetherness. The research of altruism by Titmuss (1997) on the practice of blood donors in the United Kingdom and the United States results that voluntary blood donation in the United Kingdom guarantees more blood availability, better and healthier blood quality when compared to blood donors in America that are commercially done. Voluntary blood donation has a positive beneficial effect compared to commercial blood donors in America. [Titmuss, Richard. 1995. *The gift relationship: from human blood to social policy*. New York: the new press]

The movement *Saemaul Undong* (village development with the concept of mutual cooperation) in South Korea can prove to the world that they are able to turn the underdeveloped country into a country superpower []. (mohammad mulyadi, study vol 16 (4) 2011. The program *segoro amarto* in Yogyakarta (a joint movement of the whole community for development with a spirit of mutual cooperation) can overcome poverty. Communities cooperate in mutual cooperation to build villages to achieve prosperity.

Socio-cultural value which has been ingrained in the life

of the people of Maluku is one of the capitals that are very important for increasing the unity and integrity of the nation. Masohi culture is one of the local cultures in Maluku and must be preserved.

Masohi Culture is an activity carried out jointly by a group of people who live together or have a certain relationship to express an attitude of help and help each other for a particular purpose. Cooperate and help this they do voluntarily without expecting rewards. Masohi activities can be seen when there are relatives or relatives who are building houses or there are public places such as places of worship, community meeting places, village offices and so on, the community will voluntarily flock to help ease the burden without asking for compensation. Communities both children and adults come to help with all their heart.

The values of Masohi's mutual cooperation altruism can strengthen solidarity in the lives of the people of Maluku. Mutual cooperation in building worship houses and traditional ceremonies that can prevent conflicts and strengthen solidarity can unite citizens, strengthening relationships between citizens unites different communities.

3. Methodology/Materials

This research was conducted in two state junior high schools in Ambon city consisting of 32 students of class VII of SMP Negeri 15 Ambon and 25 students of class VII of SMP Negeri 3 Ambon. This research was conducted in the even semester of the 2017-2018 school year with material scarcity and human needs. The research used was Classroom Action Research.

[13] classroom action research is an examination of learning activities in the form of an action, which is deliberately raised and occurs in a class together. The action is given by the teacher or by the direction of the teacher conducted by the student. [14] defining classroom action research is an activity carried out by the teacher or together with other people (collaboration) which aims to improve or improve the quality of the learning process. From the above definitions, classroom action research can be defined as a form of reflective research by taking certain actions to improve and improve the practice of quality classroom learning so that students can get better learning outcomes.

The stages of action research which involves plan (*planning*), action (*acting*), observation (*observing*) and reflection (*reflecting*) [15]. The planning stage is done by making a learning implementation plan that implements Masohi's altruism values with cooperative methods. The action stage by providing action in the form of giving learning material based on the values of Masohi altruism to improve students' abilities in preserving the local culture of Ambon city. The indicator of the success of the study is an increase in the ability of students to preserve local culture

with a minimum grade of class 75 average with a percentage of completeness of 75% of all students.

Data collection is done by interviews, observations, documents, and tests of local cultural preservation. Data were analyzed using quantitative and qualitative descriptive techniques. Before analyzing learning activity data students have been processed to obtain arithmetic averages. Data on student learning activities is based on the arithmetic mean of the score, i.e.

Table 1. Average score of students

Average score of	Category
75% -100%	Very good
55% -74%	Good
25% -54%	Good enough
0% -24%	Less

Student learning outcomes data obtained from tests were analyzed using a scale of 1-100. Students are declared complete if they get a score of ≥ 75 in the test. Conversely, a student is declared not complete if they get a score of < 75 in the test. This research was conducted in several cycles, each cycle consisting of planning, action, observation and reflection. The cycle will be stopped if students learn results have increased.

4. Results and Findings

This research was conducted in three cycles, each cycle consisting of planning, action, observation and reflection. The researcher collaborated with social studies study teachers to develop learning implementation plans, teaching materials, culture-based learning media values of Masohi altruism. The teacher teaches in class using cooperative learning methods. Cooperative learning methods are very important to improve student collaboration skills. Collaboration is the process of receiving and giving input from group friends or teams, giving an opportunity to submit ideas, appreciate the ability of friends to find experiences, share creativity and listen to friends' opinions to reach a joint decision [16]. The development of collaboration skills can reduce the atmosphere of competition. Learning becomes more effective and enhances teamwork. Cooperative learning aims to develop academic achievement, social skills and instill tolerance and acceptance of individual diversity [17].

In the first cycle the learning material that was given about the definition of scarcity and the learning method used was cooperative learning using power point learning media and video. The teacher begins learning with apperception, giving motivation to students about the notion of scarcity and the values of Masohi altruism. The teacher divides students into several heterogeneous small groups to discuss the values contained in Masohi culture, namely the attitude of cooperation and help without selfless

help. Students work in groups, discuss in completing the tasks given in the LKS. Some students convey the results of discussions in class and other students respond. The teacher gives rewards for group achievements. At the end of the learning the teacher together the students conclude the values contained in Masohi culture and provide examples in daily life.



Figure 1. Activity of students in group discussions

The results of the first cycle for SMP Negeri 15 Ambon showed that the class average was 61 with a grade completeness of 13% and only 4 students had finished. The results for SMP Negeri 3 Ambon showed that the class average was 62.4 with class completeness 32% and only 8 students who had completed.

After completing the first cycle, researchers and teachers reflect. Based on this reflection, it was decided to proceed to cycle II because student learning outcomes were not maximal.

Student learning outcomes in cycle I are not maximal because the teacher is not used to implementing Masohi's altruism values in social studies learning. Students are also still not familiar with cooperative methods and many do not understand Masohi values. They work on the learning steps in the LKS individually and consider friends to be rivals. All deficiencies in the first cycle will be corrected in cycle II.

In the second cycle, the teacher is getting used to the implementation of the values of Masohi's altruism. The teacher has mastered the material and provided several concrete examples in daily life through the videos displayed. The material given in cycle II was the factors that caused the scarcity of learning methods used in the second cycle was cooperative learning using power point learning media and video. The teacher starts learning with apperception, gives motivation to students about natural resources and scarcity as an economic problem and the values of Masohi altruism. The teacher divides students into several heterogeneous small groups to discuss the values contained in Masohi culture, namely the attitude of cooperation and help without selfless help. Students work in groups, discuss in completing the tasks given in the LKS.

The teacher gives scaffolding to the group that has difficulty. Students begin to get used to learning in groups. Students are more active in learning and group discussion. The teacher presents various questions that can explore students' critical thinking skills. The questions asked begin with simple questions to questions that require reflection in answering them. Learning critical thinking skills and solving problems can help students to think in depth about cause and effect and maintain the principles they believe in [18].



Figure 2. Student activities in cycle II

The results of the second cycle for SMP Negeri 15 Ambon show that the class average is 70 with grade completeness 63% and only 20 students who have completed. The results for SMP Negeri 3 Ambon show that the class average is 71.2 with class completeness 64% and only 16 students who have completed.

Based on student learning outcomes in the second cycle, student's learning outcomes have increased compared to the first cycle, but the classical completeness has not reached 75%. Therefore, after reflection the researcher and teacher decide to proceed to cycle III.



Figure 3. Students present the results of their group discussions in front of the class

In cycle III the teacher is familiar with the implementation of the values of Masohi altruism. The teacher has mastered the material and provided concrete examples in daily life through the videos displayed. The material given in the third cycle is describing human needs and the learning method used is cooperative learning using

power point and video learning media. The teacher starts learning with apperception, gives motivation to students about the kinds of human needs and examples and values of Masohi altruism. The teacher divides students into several heterogeneous small groups to discuss the values contained in Masohi culture, namely the attitude of cooperation and help without selfless help. Students work in groups, discuss in completing the tasks given in the LKS. The teacher gives scaffolding to the group that has difficulty. Students are used to working in groups, and no longer consider friends as rivals. Students are very active in learning and group discussion. The teacher presents various questions that can explore students' critical thinking skills.

The results of cycle III for Ambon State Middle School 15 indicate that the class average is 70 with 81% grade completeness and only 26 students who have completed. The results for SMP Negeri 3 Ambon show that the class average is 71.2 with 80% grade completeness and only 20 students have completed.

In the first cycle it was known that for SMP Negeri 3 Ambon the completeness of students was only 13%, and for SMP Negeri 15 Ambon students' completeness was only 32%, while in cycle II and cycle III students' completeness experienced a significant increase. Increasing student mastery learning with the implementation of learning values of Masohi altruism is presented in Figure 4.

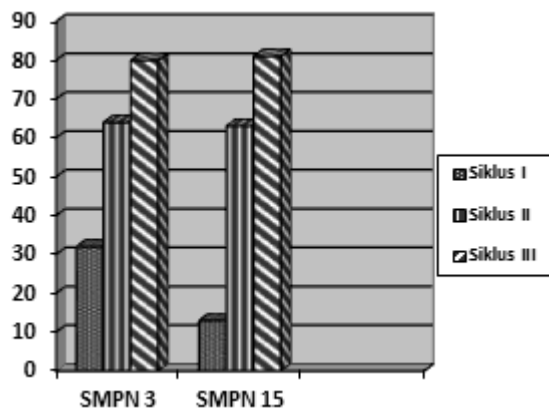


Figure 4. Increased Student Learning Completeness

From the grafik above, it can be seen that in the first cycle, cycle II and cycle III there was an increase in student learning outcomes using learning values of Masohi altruism. This means that the implementation of learning values of altruism can improve students' understanding of Masohi culture and maintain social ecological balance and can be developed as teaching materials in social studies learning.

5. Conclusions

The results of the implementation of social studies

learning with the values of Masohi altruism for social ecological balance of the first cycle, cycle II and cycle III show that there is a significant increase in learning outcomes. Thus the promotion of the values of Masohi altruism can be well understood by students and can be preserved to maintain social ecological balance.

Acknowledgements

We would like to express our gratitude to Ms. Renny Khaw, S.Pd as head of Ambon State Middle School 3, Mr. M. Pattiapon, S.Pd as head of Ambon Middle School 15. Also the vice principals of curriculum affairs and social studies teachers who teach and become observers in the class include Ms. Josina Tauran, S.Pd, Ny. Maria A. Pattiradjawane, S.Pd, Mrs. Clara Wattimena and Mrs. Ica Wally S.Pd. Appreciation and thanks also to students in both junior high schools who have helped this research.

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The Development of Social Study Model through Online on Early Child Education Program at *Muhammadiyah* University Student

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract The aim of the study was to develop a learning model, so that it could become a guideline in learning Social Sciences for students of the Early Childhood Education Study Program. Renewal in the model developed innovates conventional learning models into modern learning. The method used in this study is Research and Development, with learning prototype products developed in the form of e-modules. The results of the study after being tested in the three educational institutions used as the place of research were obtained; (a) pretest 34.94% posttest 80.12%, difference of 45.18%, (b) pretest 29.26% posttest 79.26%, difference of 50%, (c) pretest 43.67%, posttest 86.57%, difference of 42.9%. The conclusion is that effectiveness and feasibility of the model are feasible and effective to be used in social studies learning.

Keywords Development, Model, Learning, Online

1. Introduction

The results of the preliminary study found that lecturers did not use the online media as much, as a tool to assist the teaching and learning process. (Bhukuvhani, Chiparasha, Zuvalinyenga, & ICT, 2012) said the use of electronic information resources by proven work as evidenced by the results. However, there is need to mount more and frequent electronic information on training workshop resources. In fact, in the field lecturers have not utilized online media optimally as learning media to facilitate students in learning. (Dabbagh & Fake, 2017) stated online learning: concepts, strategies, and applications offer a unique approach to thinking about teaching and learning in online and Web-based contexts. (Bonnici, 2016) Carey's predictions are rooted in evidence backed by research in

both higher education and technological advancement.

Based on the opinion of Dabbagh and Carey, it can be explained that viewed from all components in the learning system is an important thing in the learning process both carried out online and with the process of the steps of the learning system. (Bello & Aliyu, 2012) stated "Dick and Carey Model proved to be more efficient than traditional lecture methods". (Dabbagh & Fake, 2017), teaching students to become effective self-regulated learners may help them acquire basic and complex personal knowledge management skills that are essential for creating, managing, and sustaining PLE using a variety of social media, actually ICT media can be integrated in learning activities. (Ghavifekr & Rosdy, 2015) stated they recognize that they do possess knowledge; students need to access as soon as possible the material they want, to answer the needs of these students, the lecturers need to innovate in learning, alternatively that can be done by utilizing the media. Online is as a place to load learning innovation results. (Getuno, Kiboss, Changeiywo, & Ogola, 2015) explained teaching and learning worldwide has gone through a transformation that has seen traditional delivery of learning material augmented by the use of Information and Communication Technologies.

Through online media students can learn by exploring and discovering what is being learned, so that there is a process of observing, looking for information. (Sangra & González-Sanmamed, 2011) explained it is a contribution of ICT to teaching and learning processes higher in the schools that have integrated ICT as an innovation factor. To attain the highest level of implies that school not only has to modernize the technological tools, but also has to change the teaching models. (Pegu, 2014) said which can be shared by means of ICT, can foster better teaching.

Traditional teaching that has not utilized ICT as one of the media in learning will hinder the progress of student learning in higher education, answering these problems.

(Oluwaniyi, Afeni, & Lawal, 2015) explained the web-based asynchronous e-learning system will reduce the classical learning system and save time and resources. (Al Gamdi & Samarji, 2016) said overcoming external sources barriers is mandatory to progress to overcoming the remaining barriers so that the focus is more on the scientific dimensions and opportunities of e-learning rather than on the logistics. Based on the reality in the field, efforts need to be made to innovate the development of learning models that will simplify and make learning more effective.

The use of information and communication technology is really needed in the world of education and learning in higher education, given the convenience that will be obtained, the need for lecturers and students to be able to utilize online media to develop learning models, in general, colleges have modern internet networks to develop learning through online is no longer a barrier to. (Suman, Chawan, & Meshram, 2011) explained now a day's most of the educational centers (universities, institutes, colleges and schools) are using some eLearning tools as an integral part of their learning systems; to enhance their traditional learning systems or use an alternative approach to virtual learning environments.

Learning in the era of information and communication technology has an impact on the development of learning technology, and learning no longer relies on one source in the form of textbooks, but can also be collaborated with the development of multi-media, implementing more varied, effective and enjoyable learning. (Embong, Noor, Hashim, Ali, & Shaari, 2012) stated in classrooms, teachers and students will start to value the convenience and accessibility of e-books. Technologists can expand e-Book usage among large number of children through creating (Ushakov & Studies, 2017) awareness of e-Book usability.

Innovation in learning is the development of new ideas that need to be communicated within the world of education. (Foote, Neumeyer, Henderson, Dancy, & Beichner, 2014) explained since instructors tend to make modifications, find out more about this process can help in the development of resources to support instructor adaptation of the reform to their local circumstances in productive and successful ways. Diffusion contains elements: (1) idea ideas, (2) products, (3) techniques, (4) technology, (5) communication channels, (6) media, (7) time, (8) socio-cultural systems, (9) customs, customs and norms.

The advantages of online learning need to be taken into account. Laurie (2016) stated online course offerings prepared and presented with student ability to review speed-based results in academic success based on actual learning and knowledge acquisition (Barac, 2015) stated A bespoke course design framework for implementation is offered to students to offer blended or online offerings in response to increasing demand for universities to offer. 21st century learning environments, there is a gap between

expectations and reality in the field, it is necessary to do research on the development of social studies learning models through online for students, according to the study. This research is designed to have 4 problem formulations that will be used as a basis for solving problems in this study: (1) how to develop learning strategies in developing social studies learning models through online, (2) how the implementation of social studies learning through online, (3) how the product process prototype of social studies learning through online, (4) how the effectiveness of social studies learning models through online.

2. Literature Review

Traditional learning models use chalk media, black and white markers, then move to the Overhead projector, the era of information and communication technology will facilitate. (Al-Hadithy & Sciences, 2015), stated the world has witnessed the boom of revolution in information and communication technology during the last decade. Lecturers can make power points with laptop media to present material to students, lecturers can develop learning models even better, if the power points are made equipped with other products such as e-modules and place them on blogs so that it will greatly facilitate students in learning. (Alsadhan, Alhomod, & Shafi, 2014) stated that the advancement in multimedia and information technologies also has impacted the way of imparting education. This advancement has led to rapid use of e learning systems and has enabled greater integration of multimedia content into e learning systems.

Online learning can be done by utilizing blog media as a place to convey information to students. (Kiliç & Gökdas, 2014) stated that Blogging has become a popular tool within an educational context. Theoretical support that has been discussed, in this study the researcher uses the blog media to place learning materials in the form of e-modules and other media which are used as learning support materials for students, for example: (1) syllabus, (2) learning plans, (3) modules. The concept of developing a learning model, can be interpreted as a thought to answer the challenges of the development of science and technology that experienced such rapid changes (Umeagukwu Emmanuel & Ngozi, 2014) stated the outcome of the study shows that ICT really has impacted positively and progressively on universities Curricular.

Learning that uses the advancement of information technology can strengthen the fulfillment of learning needs for students and lecturers in developing learning organizations so that the adoption of advances in science in ICT technology becomes a necessity, such progress can be seen as good issues and will have a positive impact on learning. (Cho et al., 2015) stated the components of the learning system design that is developed is a learning model that can be realized in the form of a blog product,

which contains: videos, images, power point articles, e-modules, learning strategies or other materials that are still relevant to learning. (Ushakov & Studies, 2017) stated the efficiency of e-learning, observed recently, has boosted a strong demand for e-learning systems at higher. The development of the learning model adopted from the theory of learning model development is done as a foothold for finding learning models that suit the needs of students and the development of science and technology. Development of learning models must pay attention to the context and characteristics of students. (Wani & Ali, 2015) When mobile phones were introduced in the world markets, little did one expect that these small handheld devices would transform the world as we knew it. This small innovation transformed the lives of millions of people.

Telecommunications / internet media which so far have not been maximally empowered as a means to facilitate lecturers and students in tool learning activities, the use of online media in learning will be easier and more enjoyable, for students and lecturers. As a facilitator the lecturer can post / enter learning objectives, syllabus, lesson plans, power points, videos, assignments, results of assessment and measurement and other information, with the use of online media learning media no longer depends on the place and time of study, students can learn wherever and whenever they wish to learn. (Tsai, Lin, & Lin, 2018) said sing digital and internet services outside the classrooms, but it has also been attained as a theme for prospective learners in a more convenient way.

The online learning model has three main things which are very important, namely: (1) lecturers as material guiding actors, (2) students as recipients, (3) administrators online learning models are learning models that are integrated between electronics and printed material learning resources. (Becker, Newton, & Sawang, 2013) stated there are three key factors that represent barriers to e-learning: the nature of e-learning as a learning approach, the use of technology, and concerns about lack of time and potential interruptions when trying to complete e-learning. Although online learning has limitations, universities need to adopt it. (Li, Qi, Wang, & Wang, 2014) stated that e-learning facilitates higher levels of learning, better aspects of innovative thinking and critical thinking. (Hattie & Donoghue, 2016) stated that e-learning facilitates higher

level learning better. Online learning is a strategy for carrying out the entire learning system from preparing, planning, communicating, providing media, learning materials, learning time which is carried out sequentially and systematically so that it can achieve learning goals, then can be seen in the learning model:

2.1. Dick and Carey Model

Dick and Carry make the components of the learning system sequentially from the beginning to the end of the learning process as follows: (1) identifying learning objectives, (2) analyzing instructional, (3) analyzing student characteristics and learning contexts, (4) formulating specific learning goals, (5) developing assessment systems, (6) developing learning strategies, (7) developing and selecting instructional materials, (8) developing formative evaluations, (9) conducting revisions to learning programs.

2.2. IDLF Model

Dabbagh, The IDLF for online learning also promotes the idea of a systematic, explicit process providing the developer with a knowledge opportunity to learn more about his learners, instructional settings, pedagogical approaches, and high effectiveness. (Noesgaard & Ørngreen, 2015) said that the research examining the effectiveness of e-Learning had increased in recent years. The IDLF model sees learning with a socio-cultural context approach, so this model is very relevant to the development of social science learning.

2.3. Conceptual Design

The design of the Dick and Carey learning model is combined with learning that utilizes the development of information and communication technology that emphasizes multimedia learning with the framework of integrative learning design (IDLF) developed by Dabbagh and Bannan-Ritland, the characteristics of this learning model are: (1) learning process virtual classroom, (2) raising social issues, (3) utilizing various types of delivery. The range of the conceptual model can be seen in Figure 1.

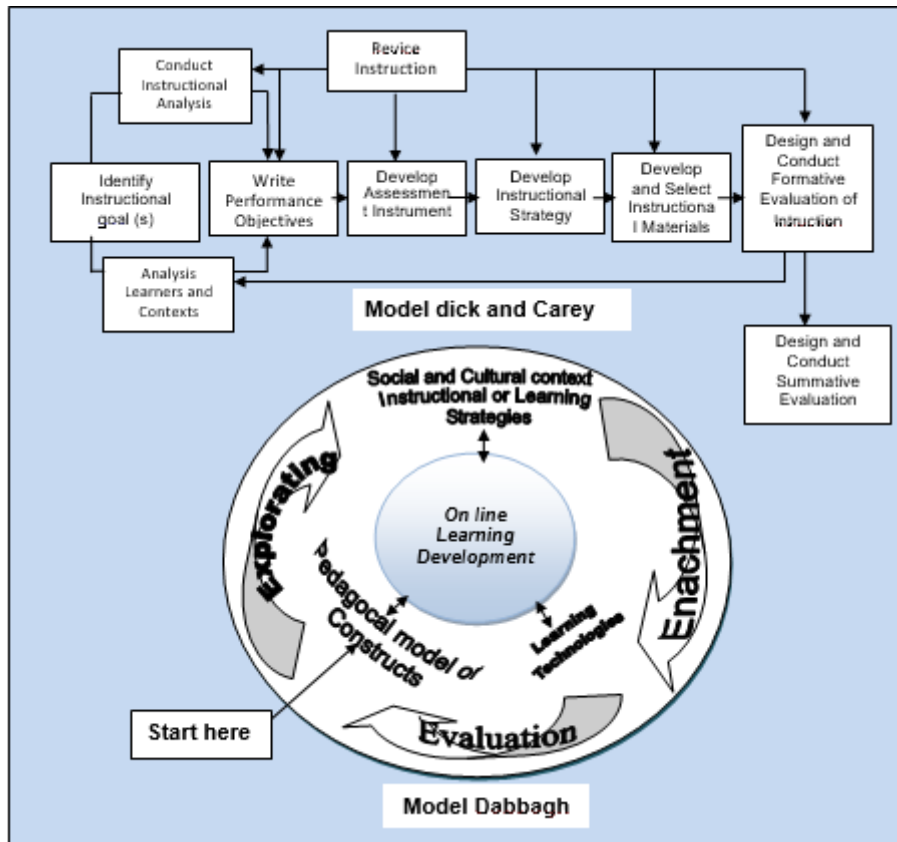


Figure 1. Conceptual Design

The IDLF model is very relevant for learning activities in higher education, this is due to the fact that most tertiary institutions already have adequate internet networks, and the characteristics of the IDLF learning model raise social problems, so it is very relevant to present a course in developing social science learning. The benefits of learning using the integrative learning design framework (IDLF), learning can be carried out using digital media and telecommunications, for urban areas, and adult learning such as digital media and communication students such as the internet are not foreign items from students, therefore this model is very good for students.

Collaboration between two learning models namely Dick and Carey and Dabbagh and Bannan-Ritland models, the design of the development model is expected to answer the challenges of the development of science in information technology and communication with the development of information and communication technology so that lecturers must be able to use the multimedia to learning activities, with the hope that the learning presented by the lecturer will be more interesting and bring a large impact on the improvement of student learning competencies. The use of information and communication technology creates changes and development in learning, lecturers who previously presented learning in a conventional manner using one

source in the form of books, so that the changes and development of learning associated with learning technology can be presented better.

The flow of information that develops so quickly, brings the result of changes in learning paradigm, with these conditions, the development of absolute online learning to be done, in the era before the development of information and communication technology, students conduct learning in conventional ways, conditions that depend on lecturers, books, time and place to study, but now students can study online using internet media that can use various media so the learning conditions will be more effective and efficient. Teaching materials arranged and published online through blog products, learning can also be done in class or outside the classroom, the material to be learned by students can be accessed whenever and wherever they will learn, so learning will be more effective and flexible, and not limited by time, but face-to-face is still needed, as a place to communicate and ask problems found in learning.

2.4. Procedural Design

The design of the procedural model in this study is illustrated by three stages of model development, each of which is revised to obtain better results, while the design drawings of the structural model are described as follows:

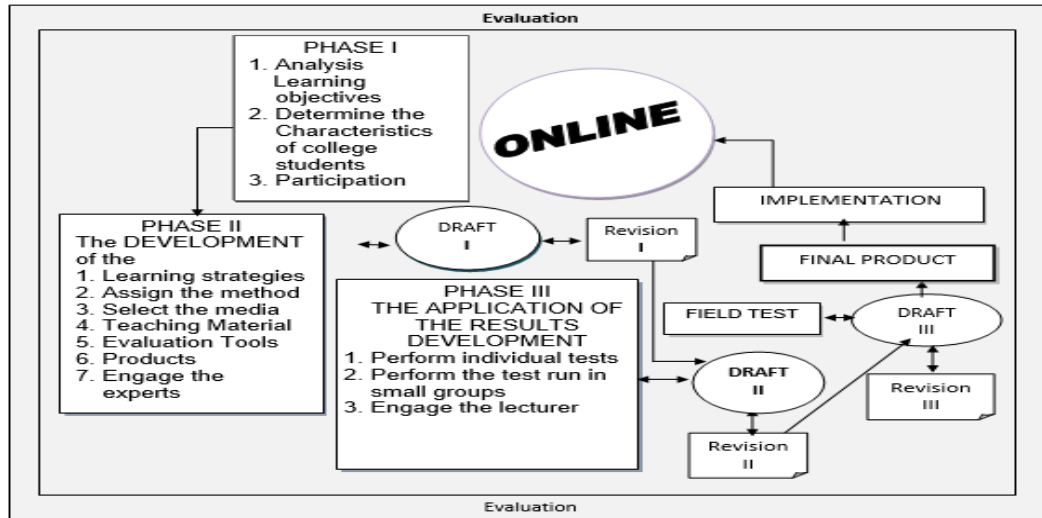


Figure 2. Procedural design

Development of the Social Sciences learning model through online in Figure 4 can be explained as follows: (1) Preliminary research (2) Development, (3) Application of development results, (4) Realizing revised results, (5)) the field after being deemed feasible is made into the final product. (6) Evaluation

2.5. Final Model

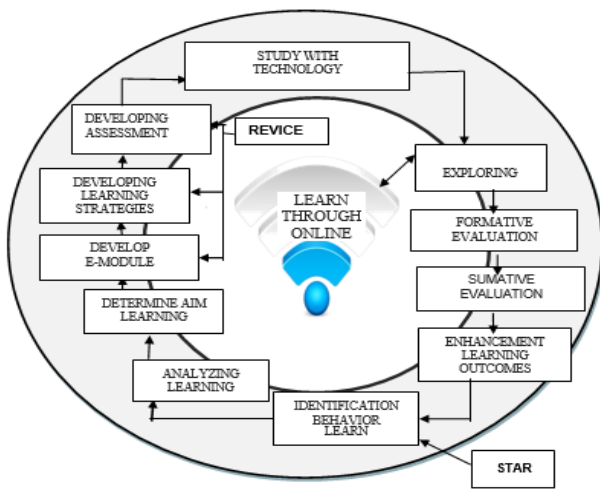


Figure 3. Final Model

Based on the description of the conceptual model and procedural models, the final model is determined.

3. Research Methods

This study uses the Research and Development method (using qualitative and quantitative approaches). One form of research, that is used to answer the problems faced by the world of education, which is caused by the advancement of science and technology so that the learning process needs to adjust to these developments, education is useful to improve the quality of learning, by discovering and developing new products, which are used to assist students in learning, the point is that learning is done by students to be easy, effective and efficient, do learning, learning is carried out with multi-media so that it has a positive impact on students with the conditions that will occur, learning is more varied.

4. Research Results and Findings

The results of field tests to test the effectiveness of student achievement using prototype learning products through online shows a very high increase, so it can be stated that the prototype developed makes it easier for students to study optimally, this model is designed to suit the learning needs of students. Utilizing ICT in learning, activities of students is helped to overcome study time, place of learning and availability of teaching materials. The results of the effectiveness test on 3 educational institutions showed an increase in good learning outcomes, the results of the effectiveness test on the model developed can be seen in table 1.

Tabel 1. Effectiveness Test Results

No.	Activities	N Respondents	Average Value	Standard Deviation	T Value	Df	Sig. T-test (2 Tailed)
1	Pre test	29	10,48	3.51142	-24.507	28	0,000
2	Post test	29	24,10	2.39560			
3	Pre test	27	10,52	1.96841	-22,715	26	0,000
4	Post test	27	23,78	2.20721			
5	Pre test	31	13,55	3.85434	-18.727	30	0,000
6	Post test	31	26,84	1.71458			

Recapitulation of the above count results can be drawn the conclusion:

1. Test free test and posttest Test results in the Early Childhood Education Teacher Education study program at the University of Muhammadiyah Pontianak indicate that the average value of the final Test and differ significantly with initial test value: (24.10 > 10.48); and the t value 0.000 smaller than 0.05 (0000 < 0.05). Thus that the models used and proven effective to test hypothesized that applied.
2. Test free test results and posttest tests on the Early Childhood Islamic Education Study Program at the Pontianak State Islamic institute indicate that that the average value of the final Test and differ significantly with initial test value: (23, 78 > 10, 52); and the t value 0.000 smaller than 0.05 (0000 < 0.05). Thus that the models used and proven effective to test hypothesized that applied
3. Test free test results and posttest tests at the Early Childhood Education Study Program at Tanjungpura University, Pontianak indicate that the average value of the final test is larger and different significant with the initial test value, namely: (26.84> 13.55); and the value of t count 0,000 smaller than 0.05 (0,000 <0, 05). Thus that model used and hypothesized to prove effective based on testing applied. Learning outcomes indicate how students are prior to being given online learning Getting unsatisfactory learning outcomes, but after students take learning through online obtain good learning outcomes, as seen in figure 4.

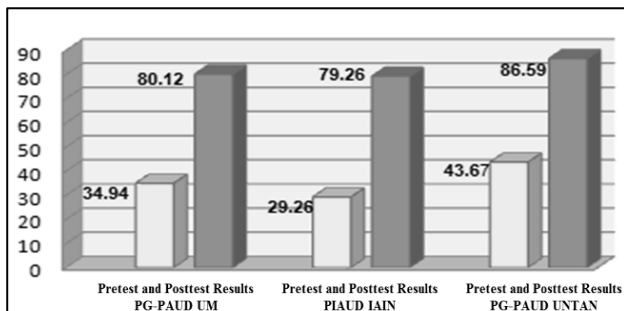


Figure 4. Field Test Results

The results of field tests show that the effective online learning model to be implemented in higher education is

because universities generally have an internet network, so students in their daily activities have used online media to communicate. Reality in the student field in the era of ICT; (1) have tools related to online media, (2) students are faced with the world of work related to online media, and this fact becomes a supporting factor for the implementation of online learning. The conditions faced by students indicate the needs of students are very high for online learning, the responses of the students who are used as respondents are illustrated in Figure 5.

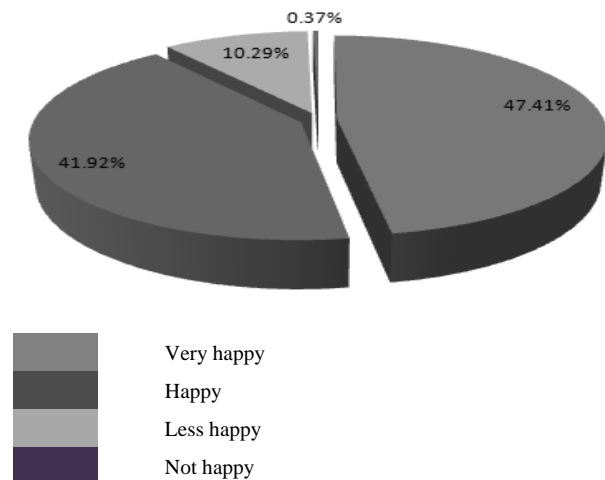


Figure 5. Student response Against Learning Models

The development of the Social Sciences learning model for students through online research results found that online learning is favored by students. (Fırat, Kılınc, & Yüzer, 2018) stated the level of intrinsic motivation among students is open and distance education. The conclusion of the research conducted by Fırat is that the level of intrinsic motivation of distance education students in the e-learning environment is decisive.

The strength of the model produced is, (1) Learning can be carried out when and wherever students and lecturers are not bound by time and place, (2) the material presented can be more, (3) learning becomes more varied (4) not bound by books package. The limitation in this study is that to implement maximum online learning needed an adequate internet network, from the results of this research the organizers have not maximally provided ICT infrastructure. (Islam, Beer, & Slack, 2015) said there are

many within this perspectives that give cause for concern; they have been grouped as challenging higher facing education institutions oral of Educational Technology. (Kebritchi, Lipschuetz, & Santiago, 2017) stated the five broad categories are: learning style and cultural challenges, pedagogical e-learning challenges, technological challenges, technical training challenges and time management challenges, to address these challenges in online education, higher education institutions need to provide professional development for instructors, trainings for learners, and technical support for content development.

The most important barriers to online learning obtained from extensive literature surveys and developing survey instruments that combine barriers that are achieved for the effectiveness of learning through online are better, which need to be considered in learning through online are: (1) organizers must provide adequate infrastructure (2) designing learning that must be carried out, because online learning must provide a variety of varied sources, (3) paying attention to the learning needs of students. (Sleator, 2010) stated cost and quality are undoubtedly the most significant drivers of successful integration of ICT in higher education, from the statement, costs also become one of the factors in the implementation of learning through online. However, ICT progress cannot be avoided by universities, given the high learning needs, learning uses technology intended to be used, using technology to enhance learning. Shana (2015) stated this is especially true in an academic environment, where the Internet is often used as a tool to facilitate deeper learning. Learning carried out through online is very popular this century and more and more educational technology experts offer web-based learning.

The responses of students who were used as respondents in the study of learning development through online students preferred learning that was conducted online. (Alias, Zakariah, Ismail, & Aziz, 2012) stated the results of the study indicate that respondents acquire and need good application of all electronic service quality the dimensions in fulfilling their needs and satisfied them. The results of the study showed that respondents obtained and needed good applications from all ten dimensions of electronic service quality in meeting their needs and satisfying them, from the results of research conducted by Alias from Malaysia found the same thing that students really need learning services through online. The learning model implemented through online brings students to conduct learning activities, so the intended learning objectives can be achieved, in line with the results of this assessment,

5. Conclusions

Lecturer learning strategies explain learning models through online with e-module products, learning activities

begin with, (1) Initial activities, lecturers are provided with 10 minutes, lecturers explain learning objectives, then do apperception with question and answer, to find out student mastery competencies to the material, (2) core activities, using the task method, discussion, question and answer study time provided 70 minutes, students conduct learning activities online by exploring through internet media to find information, to answer tasks and questions that have been provided, closing activities 20 minutes are provided for daily evaluation activities to conclude the results of learning, students are motivated to study outside the classroom by utilizing products in the form of e-modules provided as well as by looking for other sources available on the internet.

The implementation of the learning is generally facilitators deliver material with the method of divorce, discussion, and question and answer and media that are used in focus, this reality makes the learning atmosphere less varied so as to lead to maximum achievement and learning objectives, with online learning the implementation of learning is modified, for learning in the classroom through the initial, core and closing activities, the media used by commuters / laptops, android phones and using the internet, the methods used are the lecture method, discussion, question and answer, the task of exploring knowledge resources online to complete learning tasks, then adding field practice assignments to improve student skills.

Process and Prototype Products through online learning. First, pay attention to the components of the learning system: (strategies, teaching materials, learning facilities and infrastructure, lecturer competencies, student characteristics) show increased learning outcomes. The second conducts preliminary research to find out the learning needs and conduct an analysis of the learning process to obtain information on weaknesses and strengths in the learning process, making learning designs. Fourth, the results of prototype learning design with forms of learning through online in the form of e-module products that are linked to blogs that are equipped with lecturer guidance and guidance for students, fifth, make revisions as a step to correct weaknesses that occur.

Prototype effectiveness, trial by involving Social Sciences experts, learning model design experts, the results of teaching materials contained in blogs are stated to be relevant to the learning objectives, while the results of trials on students who are categorized as fast learning or highest and moderate IP are very satisfying, but for students categorized as learning with slow rhythms or low IPs experiencing obstacles, it is necessary to provide treatment in the form of assistance by facilitators / lecturers and students who are categorized as fast learning or high IP related to the content of learning that has not been understood. The results of trials in small groups on effectiveness, in small group trials found results that students categorized as high and medium IP did not

experience difficulties and learning outcomes were very satisfying but in students who had the lowest IP still had a little difficulty, thus learning through online is interesting for students, learning through online media is categorized as very helpful for students, because the presentation of material, and illustrations make it easier for students to find the desired knowledge so that they can improve student competence in accordance with the learning objectives. Field testing was used to see the effectiveness of the material developed, the results of field tests found that the development of positive learning outcomes was shown from the results of the initial test and the final test from three different educational institutions showing good learning outcomes. Based on the results of the field test it can be stated that the development of the IPS learning model through online is effective and feasible to implement, from the results of student responses to learning through great interest, so learning through online can help students in learning.

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Ability to Improve Learning Practices through the Lesson Study Model in the Field Experience Program at IAIN Pontianak

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract In general, this study aims to improve the ability to carry out Learning Practices in the Field Experience program (learning practices) through the Lesson Study model. The method used is qualitative with work procedures using a research model of action by Stephen Kemmis and Robin MC. Taggart uses a spiral cycle carried out at the Department of Islamic Education, Tarbiyah Faculty and Teacher Training at the State Islamic Institute (IAIN) Pontianak. Data was collected by inventory, observation sheets, focus group discussions and documentation. Content validation was analyzed by expert judgment, while data analysis was carried out descriptively. The results of the study showed that the lesson study model implemented in the learning practices Education activities could improve the teaching ability of prospective PAI teachers at IAIN Pontianak. The results of this study recommend that the implementation of the Education learning practices be carried out with the Lesson Study approach.

Keywords Action Research, Field Experience Program, Learning Practices, Lesson Study

1. Introduction

The Field Experience Program (learning practices) is an intra-curricular activity that must be taken by almost all citizens studying in higher education, including education science students. The aim of learning practices activities is to provide space for students (practical) to gain factual learning experiences in the field, their place, later, will work professionally. It is realized that learning experiences based on authentic experiences such as learning practices are very important (Nee Ting and Thong Wong & Ming Thang, 2009) (eg Brown et al., 2005; Joshua & Fleming,

2002).

Many terms are used which refer to this Educational Field Experience Program (learning practices). Among them are "Field experience"(Freeman, 2010); (Liakopoulou, 2012); (Eisenhardt, Besnoy, & Steele, 2012); and (Hixon & So, 2009) ;

"Teaching practice"

(Sally E. Arnett, Beth Winfrey Freeburg, 2008; and "apprenticeship" (Kennedy, 1999);(Liu, 2005); (Korpan, 2014).

Learning practices activities such as educational students are organized in the form of limited learning (Micro Teaching), guided training, and independent training directed at the formation of teacher skills, which are scheduled systematically under the guidance of tutors and supervisors.

The State Islamic Institute (IAIN) Pontianak as one of the educational personnel education institutions, also organizes performance-based learning practices activities. Experience in the field as one of the members of the Team for the Implementation of learning practices activities at the FTIK PAI IAIN Pontianak department found several things that needed to be improved. Among them is the knowledge and skills of carrying out the learning possessed by students during the learning practices process is very colored by the abilities possessed by tutors and supervisors. It was also found that the learning community among fellow learning practices students, supervisor teachers during learning practices activities in training schools was not formed.

The main principle of Lesson Study is to improve the quality of learning in stages by learning from one's own experience and the experience of peers. Lesson Study originates from Japan, with the name 'jogyokenkyu', which is understood as a model of educator professional development through the study of collaborative and sustainable learning based on the principles of collegality

to build learning communities (Directorate General of Higher Education, Ministry of National Education, Book 2: Guide to Implementation of Lesson Study, Program for Lesson Study for Strengthening LPTK).

The formulation of the problem of this research, in general is: "How is the implementation of lesson study on learning practices activities for prospective teachers of FTIK PAI IAIN Pontianak academic year 2015/2016

In particular, the questions that will be searched for are:

- a. What is the process of implementing the learning practices that implements Lesson Study conducted at the FTIK PAI IAIN Pontianak department?
- b. Is there an increase in the ability to implement learning candidates for the IAIN FTIK PAI Pontianak teachers through learning practices activities that implement lesson study?
- c. What are the opinions of the stakeholders regarding the implementation of lesson study in learning practices activities in the Department of Islamic Education FTIK IAIN Pontianak?

2. Literature Review

Lesson Study comes from Japan, with the name *jogyokenkyu*, which means "a systematic process used by Japanese teachers to test the effectiveness of teaching in order to improve learning outcomes" (Directorate of Labor Directorate General of Higher Education Ministry of National Education, Lesson Study Expansion Program for Strengthening LPTK (Lesson Study Dissemination Program for Strengthening Teacher Education in Indonesia - LEDIPSTI), Book 1 Guide to Implementation of Lesson Study in LPTK (2010)). The Study Study itself means "a model of educator professional development through the study of collaborative and sustainable learning based on principles collegiality and mutual learning to build learning communities "(Staffing Directorate, Directorate General of Higher Education, Ministry of National Education, Book 2: Guide to Implementation of Lesson Study, Program for Lesson Study for Strengthening LPTKs, (Lesson Study Dissem Information Program for Strewening Teacher Education in Indonesia - LEDIPSTI: 2009).

Indeed, in the beginning Lesson study was used as a model of teaching (training) the teaching profession through the study of collaborative and sustainable learning based on collegiality principles that help each other in learning to build learning communities (Sumar Hendayana, et al.: 007). But since 2006, lesson study has been carried out in the SYSTEMS program (Strengthening in-Service Teacher Training of Mathematics and Science Education of Junior Secondary Level). In implementing Lesson Study in three districts (Sumedang, Bantul, and Pasuruan), the three pioneering universities became assistants or provided assistance to resource persons. While at the three pioneering universities (UPI, UNY and Malang State

University), lesson study has also been disseminated in their respective faculties to several departments outside the MIPA, and even tried to be implemented in the Field Experience program (learning practices) (Directorate of Employment, Directorate General Higher education, Ministry of National Education, Book 3: Guidance for Mentoring, Lesson Study Program for Strengthening LPTKs, (Lesson Study Dissemination Program for Teacher Teacher Education in Indonesia - LEDIPSTI.; 2009). This means that lesson study in its development can be done through Action Research (Directorate General of Higher Education, Ministry of National Education, Lesson Study Expansion Program for Strengthening LPTKs, Book 2,). This is in line with Ciptianingsari's (2016) thinking, which refers to the integration of lesson study on microteaching conducted by Fernandez in 2005, namely lesson study integration on the mic roteaching with the term Microteaching Lesson Study (MLS).

The Lesson Study model is actually not a new program. Lesson Study is an adaptation of a program to improve the quality of learning carried out in Japan. With the concept of forming a school-learning community and implementing Lesson Study, a collapsed school has risen and revived (Ashintya Widhiartha, Dwi Sudarmanto, Nining Ratnaningsih: 2008)

The main principle of Lesson Study is to improve the quality of learning in stages by learning from one's own experience and the experiences of others in conducting learning activities.

3. Methods

This research has action research with the work procedures of the research model of the actions (McTaggart, 1991), which is in the form of a spiral cycle. Each cycle consists of four steps: planning, action, observation, and reflection. There are several action studies in learning practices activities, including those conducted by José Federman Muñoz Giraldo (Giraldo, Federman, Quintero Corzo, & Munévar Molina, 2002);

Daniel B. Robinson and William Walters (2016); (Lattimer, 2012); as well as (Albakri, Abdullah, & Jusoh, 2017). The followings are presented in detail the four stages of the first cycle.

Planning stage. During holding down planning, researchers along with the learning practices committee, PAI department leaders, and several supervisors discussed and conducted Lesson Study socialization for prospective tutors and tutors, distributed learning practices participants, formed an implementation team, and developed a learning practices Manual Lesson Study model draft. .

Socialization activities present Lesson Study experts, Dr. Agung Hartoyo, M.Pd (FKIP-UNTAN lecturer) as a resource person. The socialization was carried out with the assistance of the Pontianak IAIN Quality Assurance

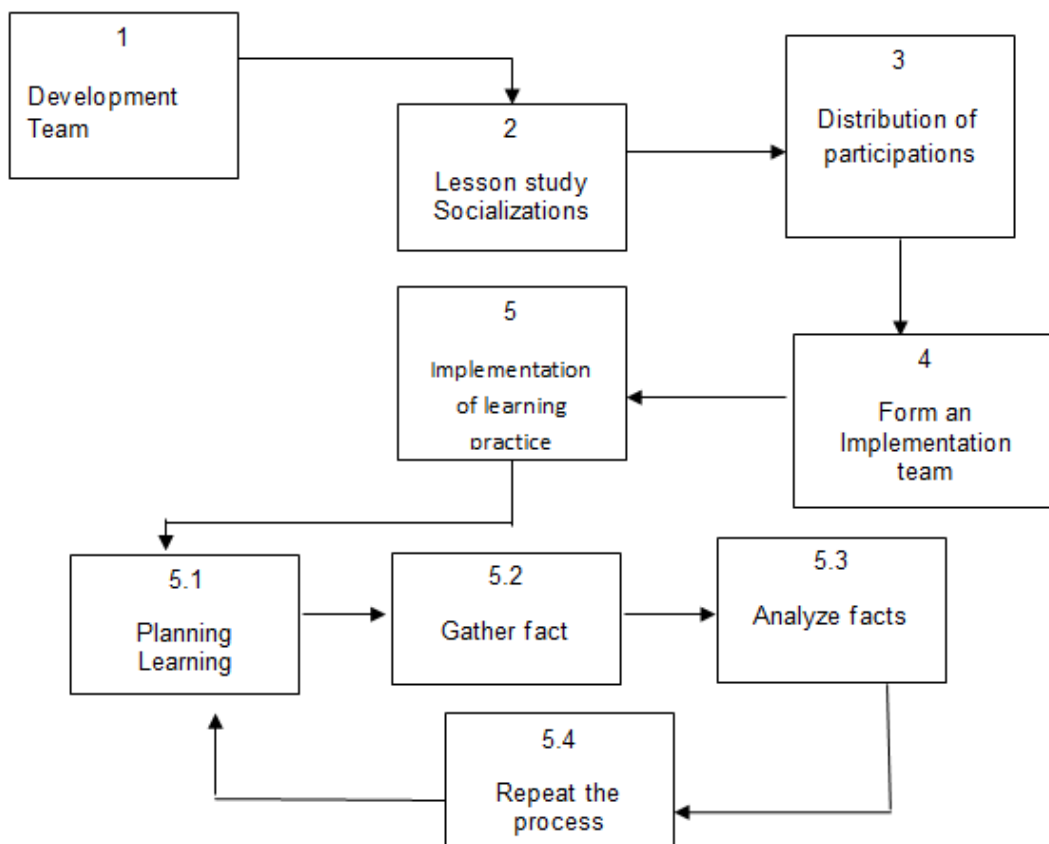
Agency in the form of Lesson Study Workshops, which were held in 2014, namely on July 19-20 2014 at Pontianak Beringin. The number of participants present in this activity was 16 people, namely 8 tutors and 8 lecturers at Pontianak IAIN. The product produced from this socialization is the learning practices Education Lesson Study Model manual.

Before the students go down to the location of the learning practices, by Pantia the learning practices implementers hold debriefing for students in general, and end with symbolic surrender to the training schools. On the last day of the debriefing activity (16 July 2016) a socialization of learning practices was implemented to implement Lesson Study for students. The socialization was delivered directly by the researcher and accompanied by a supervisor and tutor from the school / madrasah pilot.

After debriefing and socialization, each supervisor brings students guidance to the location where the learning practices is held.

Form an Implementation Team. The team consists of Chairperson, secretary and members. This team is tasked with planning the program and schedule of student learning practice, followed by developing a draft learning practices Manual Lesson Study model.

Implementation phase. At this stage, students carry out learning activities with the material set by the tutor teacher. The steps taken in the implementation of Learning Practices follow the Education Field Lesson Study Program (learning practices) model adapted from the Cerbin and Kopp version (Cerbin & Kopp, 2004).which was modified specifically for Pontianak IAIN students as presented in Figure 1,



Education of the IAIN Pontianak Islamic Education Department (Adapted from the version of Cerbin and Kopp)

Figure 1. Field Experience Lesson Study Program (LEARNING PRACTICES)

During learning practice activities, students practice in accordance with their respective roles that have been agreed upon. There are those who act as teachers and others as observers. When they carry out RPP planning discussions and reflection discussions, there are those who act as moderators, note takers and others as members of the discussion, according to the guidebook provided.

Observation stage. The symptoms observed were: the process of discussing the draft RPP, the process of implementing learning practice activities, the process of discussion of reflection. In making observations, researchers are assisted by students, tutors and supervisors. Observation activities are carried out by recording and recording all events based on observation guidelines that have been prepared in advance.

Reflection stage. The last stage of this cycle is students, tutors and supervisors reflect on the activities that have been carried out. At this reflection stage, data obtained from observations and recorded notes are analyzed qualitatively. The question that needs to be answered if resistance reflection is: is learning practices by implementing lesson study able to improve student learning skills? In addition, the shortcomings that will be corrected in the second cycle are also sought with stages such as in the first cycle.

Research Instrument. There are three types of instruments used. The first instrument was used to collect data about the process of implementing lesson study. The instrument of this study consists of 12 questions to collect data about the planning process, 11 questions to capture data about the implementation of Learning Practices, and 10 questions to collect data about the reflection process in lesson study activities.

The second instrument is used to assess RPP and implementation of learning. This instrument is used by supervisors and tutors to provide an assessment of the performance of students' Learning Practices. There are 9 questions to assess RPP and eight questions to assess the Learning Practices. The third instrument consists of 23 questions that are used to express the opinions of students, tutors and supervisors about implementing learning practices that implements lesson study.

Data analysis. Qualitative analysis is done by summarizing the results of minutes of notes in discussions, the value of lesson plans, the value of Learning Practices, and notes on the reflection stage.

4. Research result

This learning practices activity was carried out in three schools: I MTsN, SMPN 8, and SD Al Azhar. There were 14 students participating in the distribution of the three, 4, 5, 5 people respectively. Each student is accompanied by a supervisor and one tutor teacher. This learning practices activity is carried out in the form of lesson study. So,

enthusiasm begins with planning, implementation, observation and reflection.

Learning material is determined by the tutor teacher in accordance with the Learning Practices cable curriculum, students practice compiling lesson plans, preparing learning resources and doing the learning process in the classroom that has been set by the tutor teacher. Before RPP, they used to discuss it with fellow students at the same school.

Among teachers, in addition to setting classes and teaching materials for each student who is guided, also evaluate the quality of lesson plans and the lessons learned and feedback.

The supervisors, in addition to helping students who are guided in developing instructional materials through adequate reading sources, also conduct external observations when students carry out learning activities, assess lesson plans and the process of learning and provide feedback.

There are three questions that the answers sought in this study. First concerns the process of implementing this LEARNING PRACTICES senacan, the second is the impact on students and third is the opinion of stakeholders.

5. Implementation Process

5.1. Making Lesson Plan

Before being used, RPP is discussed in advance among students at the same school. Suggestions for improvements that are often delivered include: formulation of subject identity, formulation of basic competencies, formulation of indicators, formulation of learning objectives, formulation of learning scenarios, and formulation of evaluation.

In addition to suggestions, there are several things that are worth noting. Among them are: lesson plans are not always distributed to all preliminary students, not all participants give advice, there are students who are not happy with their suggestions and comments, and there are students who make lesson plans while following the discussion.

5.2. Learning Practice

Unlike learning practices in general, the learning practices implements the Study Lesson, when a student implements the learning process not only with the tutor teacher but also fellow practitioners. They are tasked with observing the learning process that takes place in accordance with the list of observations prepared by the learning practices Team.

Recapitulation of observers' notes about the implementation of the learning process shows the following things. Some parking students don't do all the learning steps that have been determined. Some

practitioners reported that the choice of learning strategies was inappropriate. Some also lack mastery of teaching materials. Learning media are not well prepared. There are also students who have not used the language properly and correctly as an instruction language in the class. There are a number of students who have not been able to master / manage the class optimally. And, what is also important to note is that there are a number of displays of students who are not right as educators.

5.3. Reflection Activity

At the end of the cycle, reflections were carried out followed by all students, tutors, supervisors, and researchers. During the reflection activity, participants flashed what had been done during that period. Most of the participants reflected that the implementation of the learning practices by implementing the lesson study had been carried out well. However, there are several things that need to be improved.

Among them is the mastery of the material of the student

practitioner, the obedience to follow the rules that Learning Practices and the observer as an educator. The results of the first cycle reflection were used as the basis for improvement in the second cycle.

6. Impact on Student Practice

In accordance with the purpose of the study to improve the ability to carry out chasing activities, the impact of students is indicated by the value of the practice of studying students from the tutors and supervisors. Tables 1, 2, and 3 respectively present a recap of values per school for learning practices locations.

Dishes per school location were chosen because the three schools had different characteristics. MTsN as a religious school, Junior High School I as a public school and elementary school al Azhar, besides the general division is also affiliated with religion. And it will be better if it is presented separately.

The combined three tables are presented in table 4.

Table 1. Results of Learning Learning Assessment at MTs. Negeri I Pontianak (assessment after conversion)

No	Name	Tutor teacher assesment		assessment of the supervisor		Total of values 50 %
		Total score	Score 30%	Total score	Score 20%	
1	Putri Pertiwi	37	18.5	34	11.33	29,83
2	Siti Muslikhah	37	18.5	36	12	30,5
3	Habeb Haddad	36	18	35	11,66	29.66
4	Nur Umi Mufhidah	37	18.5	36	12	30.5

Table 2. Results of Learning Learning Assessment at SMP Negeri 8 Pontianak (assessment after conversion)

No	Name	Tutor teacher assesment		assessment of the supervisor		Total of value 50 %
		Total score	Score 30%	Total score	Score 20%	
1	Budiman	30	15	27	9	24
2	Suci Ramadhani	30	15	30	10	25
3	M. Ashrohim	28	14	29	9,66	23,66
4	Dede Ruhmatul Gina	29	14,5	31	10,33	24,83
5	Putri Sarie	30	15	30	10	25

Table 3. Results of Learning Learning Assessment at SMP Negeri 8 Pontianak (assessment after conversion)

No	Name	Tutor teacher assesment		assessment of the supervisor		Total of value 50 %
		Total score	Score 30%	Total score	Score 20%	
1	Nurhajirah	34	17	32	10,66	27,66
2	Suhibbeh	34	17	32	10,66	27,66
3	Hariyadi	34	17	34	11.33	28,33
4	Teguh Sasmita	35	17,5	34	11,33	28,83
5	Hidayatul Akbar	35	17,5	34	11,33	28,83

Table 4. Recapitulation of the Score of the First Cycle Lesson Study Model in three schools

Recap of ALearning Practicesication of the Lesson Study Model									
No.	School Name	Score of acquisition						Average	
		act1	Act2	Act3	Act4	Act5	Total		
1	MTs,Neg.I Ptk	29.83	30,5	29,66	30,5	-	120,49	30,122	
2	SMP N 8 Ptk	24	25	23,66	24,83	25	122,49	24,498	
3	SDI Al-Azhar Ptk	27,66	27,66	28,33	28,33	28,33	140,31	28,0625	
	Rerata	27,52							

Information:

Act 1 = action 1

Act 2 = Action 2

Act 3 =Action 3

Act 4 = Action 4

Act 5 = Action 5

Range of value: 40,2 – 50,0 : very skilled category

Range of value 30,40 -40,15 ; Skilled

Range of value 20,6 – 30,35 : quite skilled

Range of value: 10,80 – 20,55 : less skllled

Range of value: 1,00 – 10,55 :unskilled

Table 5. Recapitulation of the Score of the Second Cycle Lesson Study Model in three schools

Recap of ALearning Practicesication of the Lesson Study Model								
No	School Name	Score of acquisition						Average
		act1	Act2	Act3	Act4	Act5	Total	
1	MTs,Neg.I Ptk	43.66	45.5	46	47		182,16	45,54
2	SMP N 8 Ptk	43,33	45,66	46,66	46,66	46,66	228,97	45,79
3	SDI Al-Azhar Ptk	43,33	45,66	46,66	46,66	46,66	228,97	45,79
	Average							45,76

Table 4 using the agreed range of scores shows an average score of 27.52. Means, learning practices by implying lesson study produces prospective teachers who are skilled enough to carry out learning activities. Average scores according to location schools are 30.12 (MTsN I), 28.06 (Al Azhar Elementary School) and 23.50 (SMPN 8).

By paying attention to the suggestions on the reflection of the first cycle, it turns out that the results achieved by the students in the second cycle increased significantly. The recapitulation of the second cycle is presented in Table 5.

The average score is 45.76. Achievements in each location school are approximately the same 45.54-45.76, in the

The average score is 45.76. Achievements in each location school are approximately the same 45.54-45.76, in the highly skilled category.

6. Stakeholder Opinion

Towards the end of the second cycle reflection meeting, the researchers asked all participants to fill in a

questionnaire that aimed to capture data or information about learning practices participants' responses to the implementation of the lesson study model.

From the data from the questionnaire filling learning practices participants gave varied responses both positively (strongly agree or agree) and negative towards the implementation of lesson study-based learning practices.

All stakeholders agreed that the learning practices that implements lesson study can improve the quality of the learning implementation of the students both in their lesson plans and in the implementation of classroom learning.

7. Discussion

The results of this study indicate that Lesson Study can actually improve the ability of students to carry out Learning Practices. The results of this study are in line with the results of research conducted by Mulyatun (Mulyatun, 2017), Siti Malikhah (Towaf, 2016), (Anwar & Rahmawati, 2014), and (Kostas, Galini, & Maria, 2014). The results of Mulyatun's study conducted on Walisongo IAIN Chemical

Tadris S1 students showed that learning practices with Lesson Study could improve the competence of prospective learning practices teacher students in IAIN Walisongo Chemical Tadris S1. The research conducted by Siti Malikah on the teaching practices of Social Sciences students also showed the same results. Likewise the research conducted by Rahmad Bustanul Anwar and Dwi Rahmawati and Kostara et al., showed that there was an increase in the ability in micro teaching students after using lesson study in their learning.

The results of this study are also supported by the results of research conducted by Fitri Budi Suryani et al. On students of English Language Education, Semarang State University, which showed:

Despite their lacks in teaching practice which are still found in their third teaching practice, the better areas the student teachers perform indicate that they have implemented the steps in microteaching lesson study better than those in their previous teaching practices. After the teaching practice, together with their group members they evaluated their teaching practice and discussed for further improvements for their next teaching (Fitri Budi Suryani, dkk, 2017)

The results of research supporting this study indicate that although there is still a lack of Learning Practices at the end of the research cycle, it seems that the better performance of Learning Practices carried out on students who are taught with Lesson Study than those who are not treated with Lesson Study.

The results of the calculation of the application of lesson study in improving the ability to carry out the practice of learning carried out for two cycles and 4-5 stages, has shown a very skilled score. It is based on the results of the calculation of observation scores which are then converted to predetermined categories. With the essence of Lesson Study is able to form a learning community. Students who join PPL with the Lesson Study model are able to form learning communities that consistently carry out continuous improvements both at the individual, group level and on a more general system. The results of this study are in line with the results of Ciptianingsari Ayu Vitantri's research, (Vitantri & Asriningsih, 2016), which states that the Learning Practices of lesson study based learning is one way to improve the quality of prospective teachers in Indonesia. With the provision of learning experiences for prospective teachers who are based on lesson study it is expected that prospective teachers who have completed their studies have good quality competency in science and teaching competencies (Fitri Budi Suryani, et al, 2016) (eg Brown et al., 2005; Joshua & Fleming, 2002;.....).

Increasing the score of Learning Practices conducted by Pontianak IAI PAI students through the Learning Practices of the lesson study model illustrates that students, tutors and supervisors as learning practices participants have been able to implement the steps to implement the lesson

study model in accordance with the manual given. In other words, if the Lesson Study model is Learning Practices consistently, then the results of Learning Practices conducted by Pontianak IAIN PAI students will increase. This result is in line with research conducted by Penny Lamb which stated: "The surveys revealed that 100 per cent of the PSTs felt Lesson Study contributed in a positive way to their professional and pedagogical knowledge development" (Lamb, 2015).

The increase in the success of Learning Practices by Pontianak PAI IAIN students conducted through lesson study can be explained that Learning Practices are carried out through joint observation activities and supported by multi-directional reflection. In this way, there will be openness for each student to accept a lack of self and try to improve their abilities.

The increase in scores on the Learning Practices of the lesson study model illustrates that students, tutors and supervisors as learning practices participants have been able to implement the steps in Learning Practicing the essay study model in accordance with the manual given. Exactly What is said by Marit Ulvik & Kari Smith (2011), that "practicums that focus educatively will help prospective teachers to understand the scope of the teacher's role, develop the capacity to learn from future experiences and to achieve the main goals of learning". If the learning practices model is conventionally still wanted to be maintained, then Dewey, suggests it is very important to have qualified tutors as mentors (Tuli, 2009).

Another result of the study was that there was a positive response delivered by parties involved in learning practices activities carried out through the lesson study model. There are variations in the response of participants to lesson study-based learning practices activities, giving positive responses (strongly agree or agree) and negative (disagreeing and strongly disagreeing) to the implementation of lesson study-based learning practices that can improve the quality of learning activities and other matters relating to learning practice activities of students. This finding is in line with the results of a study conducted by Frederik Voetmann Christiansen (Christiansen, Klinke, & Nielsen, 2007) who stated, "By changing the focus from the individual teacher to the group of teachers, lesson studies have the potential to be shared with the shared knowledge base of teachers and lead to less vulnerable educational systems". In other words, changes in focus from teachers to individual groups of teachers, Lesson Study are potential to improve the ability of sharing among teachers so that they can cover the shortcomings in the education system.

The finding that the lesson study model can improve the positive response of PAI IAIN Pontianak students is also in line with the findings of research conducted by Tracy C. Rock & Cathy Wilson and Mary T. McMahan and Ellen Hines (Rock & Wilson, 2005) stated that "Participants also indicated that they experienced increased confidence in approaching instruction as a result of engaging in the

lesson study experience. (the teachers who were participants in lesson study research also showed that more confidence in implementing the learning approach). In other words, the lesson study model turned out to be able to grow the confidence of prospective high teachers.

The positive attitude that increases in Learning Practices through the implementation of the lesson study model is in line with the findings of Mary T. McMahon (McMahon & Hines, 2008), who stated:

After the preservice teachers' participation in the lesson study experience, their responses to this question showed greater consideration of collaboration as an option for improving teaching and learning. They indicated that they would be more likely to seek the advice of a colleague about handling the situation or even requesting peer observation in the classroom. These responses suggest that the preservice teachers valued the collaboration from their lesson study experience.

The results of this study also revealed evidence that the response of learning practices participants to lesson study activities was positive in the sense that they could improve the quality of the learning activities of the students. This is in line with the study conducted by C. Hart et al. (2011) in Mathematics learning, which revealed a good ability among teachers in developing students' ability to respond to teacher questions; (Towaf, 2016) who found that LS is a way to improve the practice of English students' field experience; and, (Hollingsworth & Oliver, 2005), which revealed that LS was able to bridge the gap in teacher understanding of material and pedagogic problems with practice in the classroom.

The results of this study are also in line with the thoughts of Tracy C. Rock & Cathy Wilson (Rock & Wilson, 2005), which explains that LS can build teacher professionalism in learning that is very likely to inspire students to achieve good learning outcomes.

8. Conclusions and Suggestions

In general, it can be concluded that LEARNING PRACTICES by implementing lesson study can improve the skills and teaching abilities of prospective PAI teachers at IAIN Pontianak. Because 'is still new', before the study, the students, tutors and supervisors were 'introduced' first about lesson study. Another impact of this research is the growing learning community in location schools. Although in the beginning the community only attended to those who participated, it was possible that this community would develop to all school members.

Another finding was the presence of positive responses from stakeholders. Not only because of the novelty but also because it fosters their motivation to progress together. Since there were only 13 students involved in this study, it was suggested that further research would involve more participants. Thus, the ecological validity of this research

can be improved. One of the drawbacks of this study was that no control group was provided. It is recommended that in further research be developed experimental research that is able to compare quantitatively between the students who are in Learning Practices lesson study and conventional students. Such research needs to be done to improve the internal validity of the results of this study.

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Enhancing Students' Class Participation through Gamification: Creating Motivational Affordance, Psychological and Behavioral Outcomes

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract Purpose: The purpose of this study is to examine if the method of gamification may improve students' class participation during the deliverance of course content. Drive by Self-Determination Theory (SDT), this study believes that motivational affordance resulted from gamification activity may lead to psychological outcome, and this psychological outcome will lead to behavioural outcome. **Methodology:** The study was conducted using qualitative action research methodology with descriptive analysis in two classes of Enterprise Strategy course. Three phases were involved for data gathering. **Main Findings:** In phase 1, when traditional lecture was solely used, students seemed to be passive, indifferent and reluctant to participate. In phase 2, when traditional lecture is supplanted with gamification activity, students have participated actively. Similar results of phase 2 was found in phase 3, where different set of students were observed. Students also perceived that using gamification in classroom provide enjoyable and fun environment, attractive and exciting, besides enhancing knowledge. Students also perceived that gamification activity increases participation, improving motivation, creating competition, developing teamwork and bonding between students and instructor and should be conducted more. **Application:** The results of this study may be beneficial to students in term of new technique used in teaching and learning process through enhancement of knowledge circulation from lecturers to students or between the students themselves. The results may also heighten the awareness of instructors in identifying alternative tools besides conducting traditional lectures. The results also may encourage administrators in helping the instructors towards upgrading their teaching methods and performance using latest applications for the purpose of improving students' engagement. **Novelty/Originality:** The findings from study add to the body of knowledge on the significance of using gamification in classroom in order to engage students in classroom activity.

Keywords Gamification Approach, Motivational Affordance, Psychological Outcome, Behavioural Outcome, Self-Determination Theory

1. Introduction

For decades, traditional lecture has become an important or main medium in higher learning classroom delivery. Traditional lecture involves the method of transmitting the course content by a teacher, and students will listen and take notes on the information transmitted. In other words, traditional lecture may also be referred to the transmission of the lecturer's knowledge from their notes to the students' notepads (Isaacs, 1989).

Traditional lecture has its own advantages. For instance, it enables the teacher, lecturer or instructor to cover the necessary content in an allocated time; where instructors can make knowledge more meaningful by relating the lecture content to the students' prior knowledge and relate it to real life examples (Dolnicar, 2005). Despite these advantages, traditional lecture also has its own drawbacks. Isaac (1989) suggests that the transmission of the lecturer's knowledge from their notes to the students' notepads is mostly lack of thinking or processing of information. Furthermore, traditional lecture encourages intellectual passivity, as students will exhibit low level of engagement (McGarr, 2009).

The drawbacks of traditional lecture have triggered the development of alternative teaching and learning methods which may encourage students' participation in classroom. The advancement and innovation of technology has provided alternatives to overcome the students' passiveness in class, thus making the classroom active and enjoyable. Among the techniques is gamification, which refers to the usage of the elements of games in non-game

contexts (Deterding, 2011) with the goal of engaging people in a variety of tasks (Borges, Durelli, Reis et al., 2014). With the help of the advancing technology, the traditional lectures should no longer be the main teaching and learning technique, but it should be as much as possible being complimented by other active learning methods (Aliaga, Cobb, Cuff et al., 2010). Therefore, the purpose of this study is to examine if the method of gamification may improve students' class participation during the deliverance of course content.

This study applies Self-determination Theory (SDT) in explaining the motivation and outcomes that may result from gamification in classroom. SDT concerns about the choices humans made, and the motivation that drives humans to arrive at the choices. Motivations can be classified into the extrinsic and intrinsic motivation (Ryan and Deci, 2000), and is said to be afforded when the relation between the features of an object and the abilities of a subject allow the subject to experience the satisfaction of such needs when interacting with the object (Deterding, 2011). This motivation, according to Deterding (2011) is being referred to as motivational affordance. In gamification context, if the players believe that they can follow the rules and feel that they are able to attain the reward, the players are said to have the motivational affordance.

Motivational affordance that is created in the gamification process leads to users' experiential value creation (Sigala, 2015) in the forms of psychological or behavioral outcome (Hamari, Koivisto, & Sarsa, 2014; Sigala, 2015). Behavioral outcome may be viewed in the form of players' participation, task completion time and number of players participating (Sigala, 2015), while psychological outcome usually be interpreted as enjoyment and motivation (Sigala, 2015).

The focus of this study is to observe if gamification has effect on students' participation, and whether students' participation, which results from the gamification activities, may create chain of effects for generating motivational affordances thus creating psychological outcomes to the players or users (Hamari et al., 2014). The psychological outcomes will in turn lead to behavioral outcomes (Hamari et al., 2014).

From the researchers' own observations and experiences in previous classrooms, when using traditional lectures, students usually perceive that the instructor is responsible to conduct the class, and to provide them with the materials and inputs of the courses. However, students fail to realize their own responsibility in understanding the course content. These situations create passive atmosphere in the classroom, where students rarely respond to the contents from the traditional lectures. Since students perceive that the instructors play significant role in the teaching process, students' level of participation towards the lesson will be as minimal as possible. Therefore, it is crucial for the researchers, as the instructors in class, to apply different technique to enhance students' participation in classroom.

Many applications can be applied as mediums to conduct games in classrooms by the 21st century instructors, and these applications may be used by the instructors to support gamification in classroom. The interest towards gamification in education generally, and in classroom specifically, whether in its application or implications is growing, as gamification provides an alternative to engage and motivate students during the process of learning (Borges et al., 2014). Previous studies suggest that students do not participate in class because they do not feel entitled to do so. They feel like they lack power, as such, they are more likely to be silent (Vandrick, 2000). Therefore, by using applications that support gamifications in classroom, instructors may provide a non-threatening space for the collection and curation of collaborative classroom work. As a result, students may have the chance and capability to contribute to each other and learn from one another (Fuchs, 2014). Gamifications may also reduce the barriers to students contributing to class discussions (Elis, 2015) and will encourage students to engage themselves in active learning activities (Dellos, 2015). As such, the researchers expect that with the gamification technique, the low level of participation in the researchers' classrooms may be resolved.

This study provides a number of significance. For students, it will benefit in term of new technique used in the teaching and learning process through enhancement of the circulation of knowledge from lecturers to students or between the students themselves through participation in class discussions. For lecturer, this study may heighten their awareness in identifying the alternative tools besides conducting traditional lectures. Lecturers or instructors may become aware that there are some tools or applications that may be utilized in classroom in order to avoid mundane atmosphere in teaching and learning session. This study also may benefit the faculty administrators, where the results of this investigation may encourage administrators and supervisors help their lecturers upgrade their teaching performance and utilize the latest applications in improving students' participation through gamification apps.

The rest of this paper is organized as follows: literature review and methodology, followed by findings, discussions, conclusion and the avenue for future research.

2. Literature Review

This section presents the literature review of studies conducted on gamification in education and the theory used in this study, which is the Self Determination Theory (SDT).

2.1. Gamification

Surendeleg, Murwa, Yun et al. (2014) explained gamification as a concept that aims to increase the

experience of users and their engagement to a system, and the field of education is not left behind in term of the application of gamification in the teaching and learning process. Using the game elements in non-game contexts, gamification focuses on engaging people to do variety of tasks (Borges et al., 2014; Deterding, 2011). Gamification is also found to be used as an effective tool towards engaging and motivating users in non-entertainment context (Seaborn & Fels, 2015). It is also being referred to as using game-based mechanics, aesthetics and game thinking to engage people, motivation action, promote learning and solve problems (Kapp, 2012). As a tool with the goal of engaging people in a variety of tasks (Borges et al., 2014), gamification involves the element of “gamefulness, gameful interaction and gameful design” (Deterding, 2011).

In education context, gamification refers to the educational approach to motivate students to learn by using game design elements in learning environment (Hamari et al., 2014; Kapp, 2012; Takahashi, 2008) and how to make learning interesting (Lee & Hammer, 2011; O'Donovan, Gain, & Marais, 2013). It relies on the motivational power characteristics of good games, which can deliver information and demand within context (Gee, 2003), balancing challenge based on abilities, thus, prevents players from becoming bored or frustrated (Barata, Gama, Jorge et al., 2013), thus is an effective approach to make positive change in students' behavior and attitude towards learning (Kiryakova, Angelova, & Yordanova, 2014). It is important to understand the role of gamification, as by doing so, instructors may understand the conditions on how the gamification may lead to a desired learning behavior (Lee & Hammer, 2011).

2.2. Previous Literature on Gamification in Classroom

As all aspects of society, marketing, entertainment, commerce and health are changes due to current trend, education is not an exception, thus marks gamification as one of evolving style in education. A previous study explains that educators continue looking for a variety of many new tools to improve the quality of teaching and learning, and gamification method is among the new innovation in teaching and learning process (Surendeleg et al., 2014). Furthermore, a previous study also justify that using gamification such as computer games and serious games of earlier technology gives positive impact in teaching and learning process (Connoli, Boyle, MacArthur et al., 2012).

Gamification is a consequential technology of game and game-based approaches in field of education which have sturdily been investigated since eighties (Borges et al., 2014). Borges et al. (2014) stresses that gamification applications and implications have become an interest among researchers since it provides substitution to enchanting and motivating students during the process of

learning (Borges et al., 2014). Hamari et al. (2014), studied the effects of gamification by conceptualizing and classifying related studies in broad area under the question of “Does Gamification work?” which focuses on its effects from a psychological perspective, while Thiebes et al. (2014) identify game elements used in gamification with a main concentration on user motivation (Thibes, Lins, & Basten, 2014).

Game components are used as intrinsic and extrinsic factors to expand learner's motivation. Each component has its own role that touches student's behavior. For example, offering rewards is a kind of extrinsic motivation (de-Marcos, Dominguez, Saenz-de-Navarette et al., 2014). Badges: requirement should have difficulty (O'Donovan et al., 2013). Points and levels: should consist of challenges (O'Donovan et al., 2013). These components can get students in a community with other students and their achievements shown in public. In the reviewed experimental papers, the game components are assimilated into a various applications with the main goals of increasing student's engagement and satisfaction. The usage of game components or game mechanics design relays on the system's main contexts and purposes. In common, the most used components in gamified applications are feedbacks, leaderboards, points, and levels. Gamification is pictured as having low cost of development, while its components were found to be more 'delicious' or 'interesting' while surfing the learning content. Contradict to traditional instructional methodology which are perceived by students to be boring, gamification technology has great benefit to solve the traditional practice.

Barata et al. (2013) conducted a longitudinal study on students' participation when gamification is applied in the learning process. In the first three years of this study, non-gamified elements have been used, while in the last two years, students were being exposed to gamification. The results show significant improvements in term of attention to materials, online participation, proactivity and reducing grade discrepancies among students. Gamification setting in classroom has also seen in enhancing students' performance as they found games to be valuable in their learning (Nehring, Baghaei, & Dacey, 2018).

2.3. Self-Determination Theory (SDT)

This study applies Self-determination Theory (SDT) in explaining the motivation and outcomes that may result from gamification in classroom. SDT concerns about the choices humans made, and the motivation that drives humans to arrive at the choices. Motivations can be classified into the extrinsic and intrinsic motivation (Ryan and Deci, 2000). Motivation is said to be afforded when the relation between the features of an object and the abilities of a subject allow the subject to experience the

satisfaction of such needs when interacting with the object (Deterding, 2011). In other words, when a person believes that he has the abilities and skills to perform a given task, the person will have the kind of motivation to perform. This motivation, according to Deterding (2011) is being referred to as motivational affordance. For example, in a gamification setting, the players will usually be guided with rules that need to be followed and the rewards that can be obtained when a level/ levels have been achieved. Therefore, if the players believe that they can follow the rules and feel that they are able to attain the reward, the players are said to have the motivational affordance.

Motivational affordance that is created in the gamification process leads to users' experiential value creation (Sigala, 2015). The values created can be in the form of psychological or behavioral outcome (Hamari et al., 2014; Sigala, 2015). Psychological outcome usually be interpreted as enjoyment and motivation (Sigala, 2015), while behavioral outcome may be viewed in the form of players' participation, task completion time and number of players participating (Sigala, 2015). As a conclusion, this study focus on the effect of gamification, where the concept and aims are effectively implemented when the following chain of effects are achieved: game mechanics are used for triggering motivational affordances and creating psychological outcomes to the players or users in the form of enjoyment, which in turn lead to behavioral outcomes, in the form of participation (Hamari et al., 2014).

3. Methodology

This study employed qualitative action research with descriptive analysis. According to Mc Niff (2010), "*Action research is a term which refers to a practical way of looking at your own work to check that it is as you would like it to be*". Action research is done by the practitioner, and it involves oneself thinking about and reflecting on his/her work. Action research report shows how practitioner has carried out a systematic investigation into his/her own behaviour, and the reasons for that behaviour (McNiff, 2010).

This study was conducted in three phases, and the description of each phase is outlined below. In Phase 1 and Phase 2, students taking BKAM3073 (Enterprise Strategy) in A171 academic session were involved, while Phase 3 involved students taking the same course but in different academic session, which was A172 session. BKAM3073 was chosen for this study since this course is a fully theoretical course. As it is fully theoretical, students need to read a lot of materials and do a lot of discussion in class; therefore, participation is crucial for students to engage themselves in the discussions. Without students' participation, discussion would be passive and without energy, thus would become unrewarding. If students find

that the materials are not so engaging, they will not spend enough time to gain deeper understanding on the subject matter (Nehring et al., 2018). Since this study concerns in enhancing students' participation, a fully theoretical course may give good indication on whether gamification approach may develop active atmosphere in course content deliverance. BKAM3073 is an elective course taken by students in final year of Bachelor in Accounting (Hons) and Bachelor in Accounting Information System (Hons) programmes in Tunku Puteri Intan Safinaz School of Accountancy, Universiti Utara Malaysia.

3.1. Phase 1 – Traditional Lecture

Phase 1 was divided between "pre-implementation" and "during implementation" phases. In the "pre-implementation" phase, students were provided with study materials in the form of lecture notes that was uploaded on the online-learning zone. The lecture notes concern on Topic 6 (Implementing Strategy and Controlling Plans). Students were instructed to read the first part of the materials (Performance Measurement Mix, Critical Success Factors and Key Performance Indicators), and to be ready for the next lecture.

In "during implementation" phase, instructor conducted traditional lecture on the first part of topic 6. After traditional lecture, students were asked to divide themselves into groups of 3-4 persons, and to make discussions on the topic lectured previously. Instructor asked questions, observed and recorded students' participation using Participation Rubric.

3.2. Phase 2 – Gamification

Phase 2 was also divided between "pre-implementation" and "during implementation" phases. Similar to Phase 1, students were provided with study materials in the form of lecture notes that was uploaded on the online-learning zone in the "pre-implementation" phase. With the second part of Topic 6 (Alternative Models of Measuring Strategic Performance), students were instructed to read the materials, and to be ready for the next lecture. In the "pre implementation" phase of Phase 2, students were informed that there would be a game conducted at the end of the class session, and the winning teams will receive rewards. This action marked the difference between Phase 1 and Phase 2.

In "during implementation" phase, traditional lecture took place. After the traditional lecture, instructor asked the students to group themselves into groups of 3-4 members per group. Each group were asked to discuss the contents lectured earlier. Instructor then once again announced that a game would take place after the discussion. After 10 minutes of discussion, instructor conducted a gamification activity using the Kahoot! application. Instructor observed and recorded students' participation using Participation Rubric.

Gamification process created motivational affordance which in turn leads to experiential value creation (Sigala, 2015) in the forms of behavioral or psychological outcome (Hamari et al., 2014; Sigala, 2015). Previous studies postulated that behavioral outcome may be viewed in the form of players' participation, task completion time and number of players participating (Sigala, 2015), while psychological outcome usually be interpreted as enjoyment and motivation (Sigala, 2015). Therefore, this study used participation rubric which contains the element of contribution, attitude towards peers and instructor, preparedness, focus, quality of discussion and behavior to observe the behavioral outcome. Meanwhile, psychological outcome was observed through the questionnaire distributed to students, which meant to observe their enjoyment and motivation using scaled items. Besides the scaled items, the questionnaire also asked open ended questions for the purpose of trying to gauge students' perception towards gamification which might go beyond enjoyment and motivation gained from the gamification process. The scaled items were analyzed using descriptive analysis (using mean) and the open ended questions were analyzed using thematic analysis.

3.3. Phase 3 – Enhancement of Phase 2: Gamification

Phase 3 is the enhancement of Phase 2. Instructor repeated the same methodology used in Phase 2. The difference was in the respondent, where Phase 3 involved students taking the same course but in different academic session (Session A172 as compared to A171 in Phase 2). Similar to Phase 2, in Phase 3, students were given a set of questionnaire consisting of the scaled items and open ended questions. The open ended questions, which was analysed using thematic analysis may act as the improvement from Phase 2 to Phase 3.

3.4. Data Analysis

The data was analyzed using mixed method of qualitative and quantitative. Three types of data were collected and analyzed:

1. Data from Participation Rubrics

This rubric observes several traits that denote participation, such as contributions, attitude towards peers, attitude towards instructor, preparedness, focus, quality of discussion and behaviour. Each trait is scored according to 4 categories:

- i) Excellent (16-20 marks) – denotes the participation of every member in a particular group for a specific trait.
- ii) Good (11-15 marks) – denotes the participation of maximum 75% of group members in a particular group for a specific trait.

- iii) Fair (6-10 marks) – denotes the participation of maximum 50% of group members in a particular group for a specific trait.
- iv) Needs Improvement (1-5 marks) – denotes the participation of maximum 25% of group members in a particular group for a specific trait.

Besides fulfilling the function in assisting observation on students' class participation, this rubric also serves to understand the behavioural outcome resulting from gamification activity.

2. Data from questionnaire (Scaled items)

The purpose of distributing questionnaire is to observe psychological outcome that resulted from the gamification activity. Section A of the questionnaire deals with the demographic information of the students. Meanwhile, Section B observes the motives of participation in the gamification activities. In Section C, students' psychological outcome was assessed using scaled items which utilized the scale of 1 – 5 as per below:

- i) Scale 1 denotes "Totally Disagree",
- ii) scale 2 denotes "Disagree",
- iii) scale 3 signifies "Not Sure",
- iv) scale 4 signifies "Agree" and
- v) scale 5 implies "Totally Agree".

The mean for each item was taken to indicate the psychological outcome of students which results from the gamification activity. The questionnaire is adapted from previous research (Cheong, Cheong, & Flippou, 2013; Witt, Scheiner, & Robra-Bissantz, 2011)

3. Data from questionnaire (Open ended items)

The questionnaire has also included the open-ended question in Section D, which purpose is also to observe students' perception on gamification activity. This data was analysed using thematic analysis.

4. Results and Findings

Information in the below sub-sections describes in detail of the findings related to this study, which is discussed according to the phases mentioned in the methodology section. According to Sigala (2015), motivational affordance that is created in the gamification process leads to users' experiential value creation in the forms of psychological or behavioral outcome (Hamari et al., 2014; Sigala, 2015). Psychological outcome usually be interpreted as enjoyment and motivation (Sigala, 2015), while behavioral outcome may be viewed in the form of players' participation (Sigala, 2015). The findings discussed in the following sub-sections reveal the outcomes in term of psychological and behavioral outcomes which are created from motivational affordance in the gamification activities.

4.1. Descriptive Information

The beginning section of the questionnaire distributed asked about the gender of the respondents and the reason for their participation in the gamification activity. The results are stated in Table 1. Majority of the respondents are female in both semesters. With regard to their motives in participating, respondents or students perceive that their motives are for gaining knowledge, having fun and because of competition among peers.

Table 1. Demographic Information

Gender	A171		A172	
	Male	Female	Male	Female
	6 18.2%	27 81.8%	6 33.3%	12 66.7%
Motives of participation in the gamification activity	1 st choice: Fun (42.4%) 2 nd choice: Knowledge (27.3%) 3 rd choice: Competition (18.2%)		1 st choice: Knowledge (27.8%) 2 nd choice: Fun (27.8%) 3 rd choice: Knowledge (33.3%)	

4.2. Phase 1- Traditional Lecture

In the “pre-implementation phase”, instructor asked students to read the materials uploaded in the online learning for next class’ lecture. Upon hearing the instructions, students seemed to understand the task that was put on them. Some of them nodded their heads, but most of them seemed to only listen without really paying attention. Students looked like they are accepting the instructions as part of class routine.

Table 2. Student Group’s Participation Rubric during Traditional Phase

Traits	N	Poor	Fair	Good	Excellent
Contributions	7 (100.0%)	0 (0.0%)	4 (57.1%)	3 (42.9%)	0 (0.0%)
Attitude towards peers	7 (100.0%)	0 (0.0%)	4 (57.1%)	3 (42.9%)	0 (0.0%)
Attitude towards instructor	7 (100.0%)	0 (0.0%)	1 (14.3%)	6 (85.7%)	0 (0.0%)
Preparedness	7 (100.0%)	0 (0.0%)	5 (71.4%)	2 (28.6%)	0 (0.0%)
Focus	7 (100.0%)	0 (0.0%)	5 (71.4%)	2 (28.6%)	0 (0.0%)
Quality of discussion	7 (100.0%)	0 (0.0%)	3 (42.9%)	4 (57.1%)	0 (0.0%)
Behavior	7 (100.0%)	0 (0.0%)	1 (14.3%)	6 (85.7%)	0 (0.0%)

In the “during implementation phase”, traditional lecture was conducted. Some students listened to the lecture attentively, some of them take notes from the lecture, and some of them just listened and looked like trying to absorb the lecture contents. After the traditional lecture, instructor asked students to group themselves and make discussion in groups. The students reluctantly move themselves to form the groups, and after the groups have been formed, they

started to silently discuss the lecture contents, not really eager to do so. After ten minutes, instructor asked questions and requested the students to voluntarily suggest some answers. However, no one in the class had put up his/her hand to answer the questions voluntarily. In the end, instructor needed to call students’ names in order to make them answer the questions posed, which they did. Instructor recorded the observation on students groups’ participation using participation rubric. The results are outlined in Table 2.

Students formed themselves into seven groups. From Table 2 above, it can be observed that the group of students participated in the range of “fair” to “good” in every trait when the class was conducted using traditional lecture. For the traits “Preparedness” and “Focus”, most of the groups (5 out of 7 groups) show “fair” level of preparation and focus, where only 50% of group members were actually following the lecture, having necessary materials and stay focused on the lecture. However, in term of “Attitude towards Instructor” and “Behavior”, the results show that most of the group members (6 out of 7 groups) have “good” attitude towards instructor and without disruptive behavior.

4.3. Phase 1 – Reflection

In phase 1, when traditional lecture was solely used, students seemed to be passive, indifferent and reluctant to participate. Even when they sat in groups and required to perform group discussion, the discussion made was merely to follow instruction, without the eagerness in accumulating and transmitting knowledge among the group members. Students did not volunteer to answer when questions were posed, rather sat quietly until their named were called.

This situation marks that when traditional lecture is not supplanted by other active teaching methods, the level of participation by students would be low. They will tend to be passive, uninterested and just following instructions as part of class routine.

4.4. Phase 2 – Gamification

In phase 2, during the “pre-implementation session”, instructor asked students to read the materials uploaded in the online learning for next class’ lecture, and announced that a game would be conducted at the end of the session and the winning teams will be rewarded. Upon hearing the announcement, the atmosphere suddenly changed where students seemed to be totally excited. Most of them jovially talked to friends about the possibility of becoming the winning team.

In the “during implementation phase”, traditional lecture was conducted. Students listened to the lecture attentively and took notes on the lecture. When asked to form groups, they moved swiftly and excitedly, and the group discussion was alive. After ten minutes, instructor briefed students on the game instruction and the game began. Students were

seen to pay their fullest attention to the gamification activity, participated actively as group members in making sure that their respective groups win the game.

Students formed themselves into seven groups. Results in Table 3 indicate that when gamification was conducted, students' atmosphere of class participation has changed, where they participated in the range of "fair" to "excellent". The range "excellent" means that every member in the group has participated actively, and this can be seen across all traits. Only one group show "fair" level of participation in certain traits which are the "Contributions", "Focus" and "Quality of Discussion", which indicate only 50% of group members' participation. These results indicate that the gamification activity has enhanced the level of students' participation, which signifies their behavioral outcome resulted from the gamification activity.

Table 3. Students' Behavioral Outcome from Gamification Process (Phase 2)

Traits	N	Poor	Fair	Good	Excellent
Contributions	7 (100.0%)	0 (0.0%)	1 (14.2%)	3 (42.9%)	3 (42.9%)
Attitude towards peers	7 (100.0%)	0 (0.0%)	0 (0.0%)	4 (57.1%)	3 (42.9%)
Attitude towards instructor	7 (100.0%)	0 (0.0%)	0 (0.0%)	2 (28.6%)	5 (71.4%)
Preparedness	7 (100.0%)	0 (0.0%)	0 (0.0%)	3 (42.9%)	4 (57.1%)
Focus	7 (100.0%)	0 (0.0%)	1 (14.2%)	3 (42.9%)	3 (42.9%)
Quality of discussion	7 (100.0%)	0 (0.0%)	1 (14.2%)	3 (42.9%)	3 (42.9%)
Behavior	7 (100.0%)	0 (0.0%)	0 (0.0%)	3 (42.9%)	4 (57.1%)

Table 4. Individual Students' Psychological Outcome from Gamification Process

Engagement	Mean	SD
I wanted to complete the Kahoot! game.	4.67	0.60
I found the Kahoot! game satisfying.	4.73	0.57
I felt absorbed in the Kahoot! game.	4.55	0.67
Time passed quickly for me during the Kahoot! game.	4.33	0.89
I felt excited during the Kahoot! game.	4.82	0.39
Enjoyment		
I felt happy when playing the Kahoot! game.	4.70	0.47
I don't feel worried when playing the Kahoot! Game.	3.44	1.25
Task Involvement		
It was enjoyable to play the Kahoot! Game.	4.70	0.47
It was interesting to play the Kahoot! Game.	4.64	0.49
It was stimulating to play the Kahoot! Game.	4.45	0.67
It was exciting to play the Kahoot! Game.	4.79	0.42

At the end of the class session, when the game has ended, instructor distribute questionnaire to assess students'

psychological behavior. Results of the Part A of the questionnaire are outlined in Table 4.

There were 35 students who took part in filling the questionnaire. Results in Table 4 suggest that students' agree in every item that gamification process has enhanced their engagement and involvement in classroom activities, and they enjoyed themselves during the process, and the gamification activity has able to stimulate students' involvement.

In Part B of the questionnaire, students were asked of the overall comments on gamification in classroom. The data was analyzed using thematic analysis. The results suggest that students perceived gamification in classroom in a number of themes as discussed below. Some quotes from students are also provided:

No	Theme	Quotes
1.	Enjoyable and fun	"It is fun. It should be included as one of classroom activities to attract students' attention to focus in the class". "It is fun when we have game in classroom. I feel more attracted to the topic".
2.	Attractive and exciting	"When the class enjoy, will attract students coming to class". "It is very exciting and help students to understand the topic better.
3.	Enhancing knowledge	"Give advantage for us to get extra knowledge when discussing in our group to choose the best answer". "It's very fun. I learn more knowledge and information that I don't know when playing the game". "Getting knowledge in interesting way". "Gamification develop critical thinking skills".
4.	Increase participation	"Kahoot! allow us to involve with other members, stimulate the bonding and more participation". "Through games, we can cooperate with friends more than just usual class activity".
5.	Motivating	"Kahoot! game make us want answer fast and get the best score". "It motivate me to come to class. It attract more attention compare to normal presentation as usual". "Reward can increase motivation for students'.
6.	Should be conducted more	"Need to be done every time after each chapter finished". "For me, it is fun and need to frequently done".
7.	Teamwork	"Gamification also can develop teamwork skills". "It encourage team building spirit and cooperation".

4.5. Phase 2 – Reflection

In phase 2, the class atmosphere had begun to change when instructor announced that a game activity will be conducted. Students listened attentively to the traditional lecture, swiftly moved to form groups when instructed to do so. The group discussion was alive, students were found

to put their fullest effort in making sure that everybody in the group grasp the course content fully.

The gamification activity was participated by the students with full enjoyment. They engaged with the activity, provided full participation and gave the best to their team. They enjoyed the game and suggested that gamification activity to be conducted more.

4.6. Phase 3 – Gamification

In phase 3, instructor repeats the cycle using the actions in phase 2, however in different class setting. The reason of repeating the same cycle is to observe if different perception on gamification may be observed among

students in different session.

In the pre-implementation stage, the silent atmosphere in the classroom suddenly changed when the instructor announced that there will be a game conducted after the discussion session. Results of “during-implementation” stage also showed similarity to those in phase 2 (see Table 5). Students “excellently” participated in the class activity which means that every member in every group has participated actively, and this can be seen across all traits. These results indicate that the gamification activity has enhanced the level of students’ participation, which signifies their behavioral outcome resulted from the gamification activity.

Table 5. Students’ Behavioral Outcome from Gamification Process (Phase 3)

Traits	N	Poor	Fair	Good	Excellent
Contributions	5 (100.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	3 (60.0%)
Attitude towards peers	5 (100.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	3 (60.0%)
Attitude towards instructor	5 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (100%)
Preparedness	5 (100.0%)	0 (0.0%)	0 (0.0%)	3 (60.0 %)	2 (40.0%)
Focus	5 (100.0%)	0 (0.0%)	0 (0.0%)	1 (20.0%)	4 (80.0%)
Quality of discussion	5 (100.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	3 (60.0%)
Behavior	5 (100.0%)	0 (0.0%)	0 (0.0%)	1 (20.0%)	4 (80.0%)

Table 6. Individual Students’ Psychological Outcome from Gamification Process

Engagement	Mean	SD
I wanted to complete the Kahoot! game.	4.67	0.59
I found the Kahoot! game satisfying.	4.67	0.49
I felt absorbed in the Kahoot! game.	4.50	0.62
Time passed quickly for me during the Kahoot! game.	4.50	0.71
I felt excited during the Kahoot! game.	4.50	0.51
Enjoyment		
I felt happy when playing the Kahoot! game.	4.67	0.49
I do not feel miserable during the Kahoot! Game.	3.89	1.02
Task Involvement		
It was enjoyable to play the Kahoot! Game.	4.67	0.49
It was interesting to play the Kahoot! Game.	4.78	0.43
It was stimulating to play the Kahoot! Game.	4.50	0.62
It was exciting to play the Kahoot! Game.	4.67	0.59

There were 18 students who took part in filling the questionnaire. Results in Table 6 suggest that students' agree in every item that gamification process has enhanced their engagement and involvement in classroom activities, and they enjoyed themselves during the process, and the gamification activity has able to stimulate students' involvement.

In Part B of the questionnaire, students were asked of the overall comments on gamification in classroom. The data was analyzed using thematic analysis. The results suggest that students perceived gamification in classroom in a number of themes. The themes perceived by students in phase 3 is more likely similar to those of in phase 2 (enjoyable and fun, attractive and exciting, enhancing knowledge, increase participation), but for a few exceptions. In phase 2, students perceived gamification as enhancing motivation, developing teamwork skills and need to be conducted more, however these themes were not found during phase 3. Furthermore, in phase 3, students perceived that the knowledge that has been obtained from gamification activity leads to competition between groups. Students also perceived that gamification enhance bonding not only between students but also between students and lecturer or instructor. Some quotes from students in phase 3 are provided below:

No	Theme	Quotes
1.	Enjoyable and fun	"It is fun and exciting". "It was enjoyable to play the Kahoot! game".
2.	Attractive and exciting	"Best platform to attract students to pay attention in class during the learning process". "It was exciting when playing Kahoot! game in class.
3.	Enhancing knowledge	"Easy to gain knowledge". "Simple way for students to understand the topic". "We gain more knowledge and able to remember some of keypoints related to the topic".
4.	Increase participation	"Can attract students to participate in class".
5.	Competition	"We can use our knowledge to compete with other groups".
6.	Bonding	"Game activity is the way to get close between students and the lecturer".

4.7. Phase 3 – Reflection

In phase 3, researcher repeat the cycle which was conducted in phase 2, however, the objective is more focused on the themes perceived by students with regard to gamification. Similar to phase 2, the motivational affordance created from gamification activity has enhanced the psychological outcome, which can be seen through students perception on their level of engagement, enjoyment and task involvement. Furthermore, students' behavioral outcome may also be observed through their

level of participation. These results suggest that students feel that they possess the ability to interact with the gamification activity, they feel that they have the capacity to engage in the activity, therefore, they have participated well in the activity.

With regard to the themes, similar results to phase 2 has been observed. Students perceived that gamification activity is enjoyable and fun, attractive and exciting, enhancing knowledge, increase participation. However, some unique themes was also found in phase 3. Students felt that gamification also enhance bonding not only between students but also between students and lecturer or instructor, besides promoting competition between groups.

5. Conclusions

The purpose of this study is to observe if gamification enhance students' class participation. Using the setting of BKAM3073 course, several phases of actions were conducted to witness whether motivational affordance which resulted from the gamification activities leads to psychological outcome in the form of engagement, enjoyment and involvement, and finally points to behavioral outcome in the form of participation.

In phases 1, where traditional lecture was conducted, the class atmosphere was passive and mundane. However, in phase 2 and phase 3, when gamification was conducted, the atmosphere of the class becomes active and exciting. At the end of the class in both phases 2 and 3, students admitted that gamification has triggered them to engage and involve with the game activity and they really enjoyed the game. Similar results found in phases 2 and 3 may be due to the similarity in the students' demographic background such as their age and their year of study, therefore, their similar preference to active learning style was observed.

Self-determination Theory (SDT) posits that motivation will drive humans to conduct their choices. The findings of this study shows that gamification has triggered motivational affordance in the students to which leads to behavioral outcome which shown through their willingness to engage and involve and enjoying themselves throughout the game activity. Furthermore, findings also suggest that when students have positive behavior towards the gamification process, they expose their psychological outcome, which may be seen in their participation in the game activity. Students also perceived that gamification activity increases participation, improving motivation, creating competition, developing teamwork and bonding between students and lecturers and should be conducted more.

The above discussion supports the initial prediction on the role played by gamification in enhancing students' class participation. The findings from this study provides support to the benefit of using technology in classroom, which not only benefit the students, who are the main

object in deliverance of knowledge, but also to instructors, who will have alternatives in attracting students' attention and participation in classroom, compared to solely dependent to the usage of traditional lecture.

This study is not without limitation, as it focus on the outcome of the motivational affordance which results from gamification. Further studies may consider to what extent gamification leads to students' motivation in performing what they belief they could achieve.

Acknowledgements

This research work is supported by the Universiti Utara Malaysia (SOTL Grant; SO Code 13832).

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Reinforcing Civics Literacy in Sustaining Students' Learning in the Industrial Era 4.0

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract This research aims at determining the strategic reinforcements of Civics literacy in sustaining the learning in the 4.0 industrial era. The 4.0 education is a response to the needs of the 4.0 industrial revolution where humans and technology are mutually sustaining the educational advancements. This research was designed with qualitative research methods using purposive sampling technique. The subjects were the teachers of Civics Education subject and students of Junior High School. The data were collected by using the techniques of document study, interviews, and observation. Those data analysis techniques were conducted following the data reduction, data presentation, drawing conclusions, and verification. This research explored the 4.0 education trend that concerns with its several learning strategies of HOTS (higher thinking order skills), 4C (critical thinking, collaboration, communication, and creativity), reinforcing character education, and literacy. Civics literacy reinforcement has been a demand along with the development and the information technological advancements progress in fostering the critical citizens. The results indicated that the Civics literacy reinforcement in sustaining the learning in the 4.0 industrial era were carried out using several strategies, among others; 1) Civics knowledge through the development of digital literacy-based Civics education material; 2) Civics skills through the HOTS and 4C learning process; 3) Civics dispositions through character education reinforcing programs.

Keywords Reinforcing, Civics Literacy, Civics Education, the 4.0 Industrial Era

1. Introduction

The issue of literacy has been an important concern in Indonesian education, where the level of literacy in this

country remains at low and has not been internalized in people's everyday social lives. Literacy is an important means of communication which allows individuals, communities, and institutions to interact from time to time and throughout space by using language in a network of social relations (Benavot, 2015). Literacy, especially critical Civics literacy, is basically an innate skill, the ability to be acquired through teaching or acquisition. Having literacy implies that individuals have expertise in social and political knowledge, understanding, attitudes, and skills (Teitelbaum, 2010).

The results of the study carried out by the Program for International Student Assessment (PISA) in 2015 noted that Indonesia was ranked 62nd with a score of 397 out of a total of 70 state participants in the literacy category. Furthermore, Indonesia's literacy rate data in 2016 according to Central Connecticut State University, Indonesia is ranked 60th out of a total of 61 countries.

The low level of literacy shows that education has not been able to develop students' competencies and interests in knowledge. Meanwhile, the use of information technology in education plays a significant role in obtaining information quickly and widely, increasing cooperation and communication with others, and fostering personal habits of active learning and lifelong learning (Xu, 2016).

The low levels of literacy have a major impact on the quality of education in Indonesia. This happens due to the increase in internet users which has not been equally balanced with the increase in digital literacy. Digital literacy is aimed at increasing individual's ability to read, analyze, and use information in the digital world (big data). Technology literacy aims to provide an understanding of the workings of machinery and technology application (Aoun J. , 2017). In the 21st century, there has been a significant change in the field of education marked by a shift in the education paradigm that should be relevant with the prepared skills of human resource competencies to deal with the industrial era 4.0.

In the future, the number of internet users will continue to increase as evidenced by the production of mobile devices that exceed 2 billion and is estimated to reach 2.7 billion (Hanchman, 2011). Having skills in dealing with the era of advancements in communication technology, including computers and cellular devices is a fundamental ability that any learner needs to have. Digital literacy skills help students in carrying out learning activities in schools, in addition to improving human life and advancing education.

The industrial era 4.0 was marked by an increase in manufacturing digitalization followed by four driving factors such as; 1) the increase on data volume, computing power, and connectivity; 2) sophistication of analysis, ability, and business intelligence; 3) new interactions that integrate humans with machines; and 4) advanced digital transfer instructions to the physical world, such as robotics and 3D printi (Lee, Lapira, Behrad, & Hung-an, 2013). On the other hand, education 4.0 is a response to the needs of the industrial revolution 4.0 where humans and technology synergistically facilitate education. Furthermore, Aziz Hussin (2018) suggested a new vision of learning to encourage students to learn not only the needed skills and knowledge but also identify the sustaining resources of these skills and knowledge.

In addition, Civics education is a fundamental subject and contributes to strengthening Civics literacy as emphasized by Milner (2002) "... the most likely method of improving the levels of Civics literacy is Civics education". Then Leahey (2011) suggests that, through Civics literacy, it enables students to become active participants in building their own knowledge and worldview, seeing education as a provision to face the forces that shape and limit their lives. Students who have developed Civics literacy skills understand how to become knowledgeable citizens, participate in initiating community change, and identify their own values while connecting them with the wider community (Argenal and Jacquez, 2015).

There are several existing core components in Civics literacy, i.e. Civics knowledge, Civics skills, and Civics dispositions which are determinant factors in the effort to realize smart and good citizens. Formally the constitutional importance of Civics literacy seeks to educate the nation's life stipulated in the fourth paragraph of the Preamble of the 1945 Constitution, and Article 31 of the State Constitution of the Republic of Indonesia, further explained in Article 2, 3, 37 of Law Number 20 of 2003. In the explanation of Article 37, it is stated that: "... Civics education aims at establishing students to humans with a sense of nationality and love for the motherland".

This research is projected as strategies in strengthening students' Civics literacy oriented learning in the industrial era 4.0 in junior high school. Reinforcing Civics literacy is the impact of the push for information technology development and the flow of globalization. Thus, in

supporting learning in the industrial era 4.0 based on digital technology and information, it is necessary to strengthen Civics literacy.

2. Literature Review

2.1. Civics Literacy Reinforcement

Literacy according to Teitelbaum (2010) is described as individual's awareness or knowledge in certain subject areas. Literacy, especially critical Civics literacy, is usually not an innate skill and should be taught and acquired. Having Civics literacy means being an expert in social and political knowledge, understanding, attitudes, and skills. Civics literacy concerns individuals' abilities to name, analyze, and act on social or political issues. Students who have developed Civics literacy skills will understand how to become knowledgeable citizens and participate in initiating social change (Argenal and Jacquez, 2015).

2.2. Civics Education

Civics education refers to formal and informal training provided to citizens aimed at enabling them to be able to develop knowledge, upholding positive the needed values and skills as effective contributions to engage political process and as civil society (Finkel , 2000). Civics education is a basic element of education in Indonesia aimed at fostering citizens to participate in the public life of democracy, consciously willing to use their rights besides carrying out responsibilities based on the necessary knowledge and skills (Adeyemi, 2018).

Civics education and human rights currently include world citizenship. Individuals are not only expected to be good citizens in their country, but also effective world-scale citizens (Kezban K. , 2014).

2.3. Industrial Age 4.0

Industry 4.0 introduces us to flexible mass production technological advancements (Kagermann, Wahlster, & Helbig, 2013). Machines systematically operate independently or integrate with human abilities (Sung, (2017)Industry 4.0 is a sort of approach to controlling the production process that synchronizes time by integrating and adjusting production (Kohler & Weisz, 2016).

Furthermore, Liffler & Tschiesner (2013) note that the basic principle of industry 4.0 is the incorporation between machines, workflows, and systems, by applying intelligent networks along the chain and production process to control each other independently. Additionally, (Hermann, Pentek, & Otto, 2016) the principle promoted by industry 4.0 is manufacturing interconnection between the ability of machines, devices, sensors, and humans to connect and communicate with each other through the Internet of

Things (IoT) or the Internet of People (IoP).

3. Methods

This research was designed with qualitative research methods applying purposive sampling as a technique of obtaining data. The subject of this research involved Civics education subjects and junior high school students. Data collection was carried out through document study techniques, interviews, and observations. Data analysis techniques apply data reduction, data presentation, conclusions, and verification. Regarding this research, Civics literacy includes three components of citizenship, namely Civics knowledge, Civics skills, and Civics dispositions. Thus, the development of learning materials and the implementation of teaching and learning activities were used as materials which were then analyzed.

3.1. Data Collection Process

Data collection was carried out through document study technique including syllabus, learning implementation plans, and examining instruments of knowledge, skills and attitudes. The interview technique was carried out to Civics education teachers and junior high school students. The observation technique was carried out during teaching and learning activities in the classroom.

3.2. Data Analysis

The data analysis technique was carried out by means of data reduction, data presentation, conclusions, and verification. To analyze Civics literacy, a number of criteria were determined to determine the results of the assessment of Civics knowledge, Civics skills, and Civics dispositions. First, Civics knowledge analysis was realized through developing Civics Education based on digital literacy. Second, Civics skills analysis is realized through the learning process in an integrative manner using HOTS and 4C (critical thinking, collaboration, communication, and creativity). Third, Civics disposition analysis concerning character-oriented educational activities.

4. Results and Findings

In the Civics education context, the development of Civics literacy in the 21st century is focused more on maturing citizens towards a global-minded society. Identical global citizens thinking, heart, body and soul who are socially able to work and prepare intercultural relations can maintain their uniqueness, in addition to maintaining integrity in the public sphere.

Based on the results of this research, Civics education plays a significant role in shaping the younger generation to be smart and good citizens. Good citizens are reflected in

three main aspects, namely Civics knowledge, Civics skills, and Civics dispositions. Civics education should help students through developing identity and attachment to the global community.

Civics education is a very influential subject to encourage Civics literacy reinforcement as in Milner (2002) 's opinion [.....] the most likely method of improving the levels of Civics literacy is Civics education ". In addition, Leahey (2011) Critical Civics enables students to be active participants in building their own knowledge and worldviews and using education as a tool in interrogating and confronting the forces that shape and limit their lives.

Reinforcing elements in an education system urges the emergence of a reformist movement in response to the 4.0 industrial era, where one of them as proclaimed by the government, namely the new literacy movement aims to reinforce and even shift the old literacy movement. The new literacy movement is intended to focus on three main literacies namely, 1) digital literacy, 2) technology literacy, and 3) human literacy (Aoun, 2017). These three skills are predicted to be typical of fundamental skills and are needed in the dealing with industrial era 4.0.

The problems surrounding literacy have shown public interest in Indonesian education, where the level of literacy in Indonesia is considered still low and has not been internalized in people's daily lives. The low level of literacy shows that education has not been able to develop students' competencies and interests in knowledge. Therefore, to sustain technology-based learning and digital information in the industrial era 4.0, students' reinforcement of Civics literacy strategies are significantly needed.

Civics literacy concerns knowledge in the public sphere regarding governance and the role of citizens in various fields such as Civics knowledge, Civics skills and Civics disposition. This Civics literacy should be the duty of every young citizen as a provision in realizing citizens who are ready to face challenges in the industrial era 4.0. Based on the results of research carried out in junior high schools through the technique of interviewing Civics education teachers and junior high school students, Civics literacy is carried out referring to three strategies that lead to Civics knowledge, Civics skills and Civics disposition.

4.1. Strategies Used to Reinforce Civics Literacy on Civics Knowledge through Developing Civics Education Based-Digital Literacy

Civics literacy concerns digital citizenship which is the knowledge and skills in today's digital world. Digital citizenship concerns the ability to participate in online society (Mossberger, Tolbeert, & McNeal, 2008). Given that this industrial revolution 4.0 era requires digital literacy as an effort to advance themselves in the online world, these skills will become an important capital in cross-country communication.

With regard to the industrial revolution era 4.0,

technological advances change individuals' ways of life, work, socializing, and learning. This technology facilitates lifelong learning. However, in the fields of education and literacy, the potential of this technology has not been fully adapted in pursuing educational trends 4.0. Civics literacy and digital citizenship as the underlying themes of future learning activities are oriented towards increasing the understanding of citizens towards political and governmental processes.

The result of the research reinforcing Civics literacy is an important element in Civics education that aims to improve students' critical and creative thinking skills. Civics literacy is an important part of citizenship, thus, those who aspire to become smart and responsible citizens first master this literacy. Reinforcing Civics literacy, especially digital literacy is an absolute thing to do, thus, it enables the public to be able to recognize and organize news consumption which ultimately contributes to understanding the community about the truth and facts behind a news story and distinguishing between the false and true news.

The low level of skills and literacy in the digital era led to the use of incompetent technologies such as the irresponsible attitudes of using technology. Thus, the use of competence in using technology is more popularly known as digital literacy (McGonagle, 2011). Monroe (2004) adds that digital literacy includes basic, scientific, and technological literacy, visual and information literacy, multicultural literacy and global awareness. A good education should consider individual development where they are not only expected to be able to read and write but also to understand and communicate efficiently.

Based on the results of interviews and observations towards the students' Civics literacy reinforcement on Civics education subject learning process, it applied discussion method on a topic around the currently occurring controversial issues. At the time they were given the assignment, a Civics education teacher assigned students through internet access. On the other hand, the material taught is not only limited to textbooks, however, students were also asked to be actively engaged in seeking additional information through internet access. Through this digital literacy activity it is intended that students' insight into the subject matter become wider. Student literacy activities are carried out in the syntax of seeing, observing, reading, and listening.

In the context of citizenship, Milner (2002) notes that digital literacy skills are one of the competencies of Civics literacy. Regarding the relevance of Civics education in educating young citizens to have literacy competencies towards the era of industry 4.0, Banks (2008) further explained that citizenship education should help students develop their identity and attachment to the global community.

4.2. Strategies Used to Reinforce Civics Literacy on Civics Skills through HOTS Learning Processes (Higher Order Thinking Skills) and 4C (Critical Thinking, Collaboration, Communication, and Creativity)

Based on the results of research, technological advances including critical thinking skills, collaboration, communication, and creativity have become the key core in education, especially when dealing with Civics literacy. In sustaining the industrial era 4.0 according to Salpeter (2008), it identified a number of traits that citizens need to have. First, individuals should have the skills to make smart choices. Second, individuals are able to meet the demands of being able to be proficient in academics, interdisciplinary knowledge, and literacy. Third, individuals are required to be able to participate intelligently, productively and responsibly in the digital world.

On the basis of the research results conducted in learning activities, the 4C (critical thinking, collaboration, communication, and creativity) was carried out by students in the following syntaxes:

1. Problem statement: students carry out their critical thinking activities by identifying as many questions as possible regarding the material being studied beginning from the factual to hypothetical questions in developing creativity, curiosity, the ability to form questions to form critical thoughts that need to live smart and lifelong learning.
2. Data collection: students do mutual cooperation by establishing groups to discuss, gather information, present, and exchange information about the material being studied.
3. Data processing: students do mutual cooperation and seek critical thinking by discussing the process of observing data in groups.
4. Verification: students do critical thinking by discussing the results of their observations and verifying the data obtained or the theory used in the textbook.
5. Generalization: students engage in communication to convey the results of group discussions through a presentation session. In addition to that, students were asked to think creatively by concluding important points addressed in the previously done learning activities.

In the era of industrial revolution 4.0, it has been proven that technology is one of the important factors in everyday human life. This implies a significant impact in the world of education, especially Civics education. According to Farisi (2016), important skills of the 21st century should be internalized into the education system, including "learning and innovation skills" (including critical thinking and problem solving, creativity and innovation, communication, and collaboration).

Meanwhile, the skills that students should have in dealing with technology-based education in the industrial era 4.0 according to Monroe (2004) include:

1. Communication, both in class and at home with parents;
2. Creativity, which allows students to create and reflect on their own understanding of the material being read or studied;
3. Critical thinking, both that occurs before and after reading activities such as asking and predicting;
4. Collaboration, which involves students reading in teams and analyzing what they read.

Applying the 4C (critical thinking, collaboration, communication, and creativity) as the basis of learning methods refers to Vygotsky's Zone of Proximal Development (ZPD) in constructivism learning theory. Vygotsky (1978) defined the "Zone of Proximal Development (ZPD) as a distance between the developmental levels of students when solving problems individually and when problem solving with others (peers, teachers, parents, etc)". Interactions occurring between students and adults or peers can encourage students' cognitive development.

Vygotsky further suggested that in the Zone of Proximal Development (ZPD), a teacher and students in mutual cooperation solve problems in a task where a student might not be able to complete individually. This interaction between teacher and student produces cognitive changes that are internalized in students. Students elaborate on their individual understanding of social interactions and construct meanings through combining these understandings with their personal experiences.

Students are able to learn concepts perfectly well if they are in ZPD. Students work in ZPD if they cannot solve problems individually, but are able to solve them after getting help from an adult or friend (peer). Given the assistance is intended so that later the students are able to do tasks or questions that have a higher level of complexity than students' level of cognitive development. This is where the importance of implementing 4C (critical thinking, collaboration, communication, and creativity) lies.

Constructivists in their perspective view the role of collaboration as great, and it is reasonable that interacting with others can stimulate the restructuring of people's understanding. The role of collaboration is growing rapidly in social constructivism (Vygotsky, 1978) stating that learning occurs first in the inter-psychological (social) realm before being internalized in the intra-psychological realm.

The reinforcing strategies of Civics literacy on Civics skills through the HOTS learning process (higher order thinking skills) significantly help students improve their critical thinking skills. 21st century oriented skill learning offers HOTS and contextual learning. This is in line with the four pillars of education according to UNESCO,

namely learning to know, learning to do, learning to live together and learning to be that allow students to be able to connect learning material with their real lives.

Kenney (2013) suggested that in choosing the best option, individuals need to know how to think critically. In addition, Ennis (2011) defined critical thinking as reasonable and reflective thinking that focuses on deciding what to believe or do. For Facione (2013) critical thinking has six components, namely:

1. Interpretation, to understand the experience, data, events, assessments, rules, etc. (Ennis, 2011)
2. Analysis, to identify the relationship between events, concepts, and other forms of assessment (Demir, 2006)
3. Inference, in the sense of drawing conclusions according to available evidence (Demir, 2006)
4. Explanation, which justifies explanation in a coherent, methodical, reasonable way (Lowy, 2013)
5. Evaluation defined by Facione (2013) as the ability to assess the logical strength of actual inferential relationships or what is meant between statements, descriptions, questions, situations, etc.
6. Self-regulation, more specifically self-awareness to monitor individuals' cognitive activities (Facione, 2013).

Hagop (2015) further added that critical thinking has a fundamental role in education, namely as a means to foster democracy, related to the idea of fostering responsibility in the use and application of science, technology or scientific development. Critical thinking is seen as one of the highest sequences of cognitive abilities. (Helena Pedrosa, Aurora, & Betina, 2014).

Rui, Celina, & Isabel (2011) explained in his research that in various countries, many efforts have been made in integrating critical thinking into the curriculum, this is oriented, therefore, in the future living in a pluralistic society, students are able to apply their citizenship competencies. This also confirms that critical thinking is an important aspect of promoting the realization of democracy, given that critical thinking is a very important component in the contemporary education system.

Rubinfeld & Sceffer (2015) suggested that in the modern world, being able to solve problems through critical thinking is vital knowledge that enables individuals to survive. That is in accordance with the results of research where students tested their quality by applying HOTS learning (higher order thinking skills) oriented as a Civics literacy enhancement program.

As a result of this industrial revolution 4.0, a citizen should have at least eight abilities of modern humans in the 21st century, among others, to: 1) recognize global problems, 2) cooperate, 3) tolerate, 4) critical thinking, 5) show sensitivity to human rights problems, 6) solve complex problems, 7) master technology and information, and 8) participate on the political process.

4.3. Reinforcing Civics Literacy Strategies on Civics Disposition through Reinforcing Character Education Programs

Education is a central home for those who are prepared to have excellent human character. This research was conducted through a reinforcing program for character of junior high school students. Character education at least meets the needs of early adolescents (seventh, eighth, and ninth grades) to reinforce their social competence (Cheung, 2010). Some studies explored the significant contributions of character education to the social competencies of elementary school students (Miller, Kraus, & Veltkamp, 2005). However, a contribution remains empirical evidence and generalization, given that previous research seems to have not been rigorously carried out and focused on research problems like this (Was, Woltz, & Drew, 2006). Character education technically refers to formal lessons given to students in schools which have been internalized and in accordance with the given curriculum to reinforce students' personal characters.

Thus, character education emphasizes the development of students' overall moral character, which reaches beyond cognitive development in moral reasoning. Character education respects students' emotional and values development within a morally and socially competent manner. Weisz, Sandler, & Durlak (2005) added that a reinforcing character education program contributed more to students who were previously with lower social competence

Individually, characters are human parts that signify one another, besides being born from birth. The innate character is not different from the character of the nation, and the national character is forged in individuals rather than innate (Koellhoffer, 2009). Character determines one's sika, thoughts and actions in their interactions with others around them. Thus, the character includes moral values, attitudes, and behaviors that manifest into everyday human habits. An individual is deemed to have a good character if they consider themselves moral, have moral feelings, and take moral actions.

Civics literacy is defined as the knowledge capacity and ability of citizens to understand their political world. In addition, it is broadly defined as the capacity of knowledge about how to actively participate in initiating community change, as well as the willingness and ability to engage in public discourses. The results of the research show that through citizenship education, it can develop the national character such as nationalism, discipline, self-confidence, honest behavior, toughness in dealing with problems of responsibility, curiosity and environmental care.

The fundamental elements determine the character of the nation should be inculcated or developed in students as the younger generation, considering they are agents of national change. Therefore, the strength of character education is very significantly given to junior high school students. Some underlying values need to be the focus of character

education, including 1) reinforce the integrated aspects between knowledge with logic and honesty, 2) foster a sense of nationalism, 3) foster tolerance, 4) foster democratic values, 5) enforce the law.

5. Conclusions

This article concludes that Civics literacy concerns the knowledge of governance and the roles of citizens in it are divided into several sub-categories such as; Civics knowledge, Civics skills and Civics disposition. This Civics literacy is a fundamental understanding which is inevitably the obligation of every citizen, especially the young generation, as a provision to create citizens who are ready to face challenges in the industrial era 4.0. First, the Civics literacy reinforcement of the Civics knowledge is realized through developing digital literacy-based Civics education material. Strengthening Civics literacy, especially digital literacy is a fundamental thing that needs to be done so that people are able to recognize and understand the truth behind dissemination of messages from the media. Thus they will be able to determine whether the information they consume are facts and truth or even hoaxes. Civics literacy and digital citizenship are both concerned with the level of citizens' literacy skills, where their noble and positive goals enhance citizens' understanding of the political and governmental processes. Second, the Civics literacy reinforcement strategy on Civics skills is applied through the HOTS learning process (higher order thinking skills) and 4C (critical thinking, collaboration, communication, and creativity). 4C activities were carried out by students in the syntax as follows: statement problems, data collection, data processing, verification, generalization. Third, the strategies used to reinforce Civics literacy on Civics disposition are realized through character education inculcating program. Some of the significant values concerning character education among others are: 1) reinforce the integrated aspects between knowledge with logic and honesty, 2) foster a sense of nationalism, 3) increase tolerance, 4) enhance democratic values, 5) uphold the law.

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How to Implement the Savi Learning Model for Students with Reading Difficulties

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract The purpose of this action research is to describe the application of the SAVI learning model and learning for continuous students to learn to read in the fourth grade of Tomohon State Elementary School II and SD GMIM III Tomohon. The method used in this study is action research. Action research provides useful answers for teachers or educators in conducting studies in a school and providing input that requires help to improve what has been done real. This study uses the Elliot model with quantitative and qualitative research (mixed methods) in the field of data analysis. Based on the results of the assessment, discussion of researchers with collaborators, and achievements of student learning outcomes in each cycle, it can be concluded that: a) Thematic learning outcomes and learning in sustainable students in grade IV of Tomohon Elementary School II and SD GMIM III Tomohon can be searched through the application of the SAVI learning model, b) The learning process that applies the SAVI Learning Model is able to overcome the difficulties of students, namely learning continuous difficulties for subject matter with moving learning, understanding, listening and thinking to improve learning and learning outcomes improve.

Keywords SAVI Learning Models, Students with Reading Difficulties, Learning to Read

1. Introduction

Reading skills are the basis for mastering various sciences. If children at early school age do not immediately have reading skills, they will experience many difficulties in learning various fields of science in the following classes. (1).

Reading is one of the academic skills that students must

have at school. This skill is one skill that influences the academic success of students. To be able to understand a concept of science, students must have reading skills, because reading skills are basically one of the main material in Indonesian language subjects, and then students are used to understand the various knowledge they will learn. (1).

Furthermore, according to Abdurahman, reading is a skill that must be taught since students enter elementary school, therefore if students experience difficulty reading they must be overcome as soon as possible, because reading is a capital for learning. (1).

Therefore there are five stages of reading development, namely (1) readiness readiness, (2) beginning reading, (3) speed reading skills, (4) extensive reading, (5) real reading.

The stage of reading readiness covers the period of time from birth until reading lessons are given, generally during the first grade of elementary school. The initial reading phase starts from class I elementary school, namely when children are six years old, including children who have learned to read earlier and children who learn to read at the age of seven and eight years. The speed reading phase generally occurs when the child sits in class II or III, and at this stage is expected to understand the relationship of sound-symbols. The broad reading stage generally occurs when children have been in grade IV or V elementary school, at this stage children are expected to enjoy and enjoy reading. While at the reading stage actually occurs when students sit in class VI, at this stage it is expected that children can understand correctly what they are reading.

Reading skills can develop if done with a lot of practice regularly. To improve reading skills among students there must be a design or learning model that is able to motivate them to review the latest findings, both those that are related to their field of study and other fields of study.

Based on the results of preliminary observations in class IV of SD Negeri II Tomohon, a number of students found it difficult to understand the contents of the reading

empirically. Their prevalence is 10.5% of the total student population in one class. This amount certainly affects the learning climate. In addition this difficulty will have an impact on the development of students to understand various knowledge and skills in other fields of science.

Because the difficulty of reading comprehension is identified, among others: (1) difficulties in determining the main ideas and paragraph explanatory ideas, (2) difficulty in determining the sentence relationship in the reading, and (3) difficulty in determining the facts in the reading.

The existence of difficulties experienced by students in understanding the contents of the reading is allegedly as a result of the implementation of reading comprehension learning which still often uses conventional learning strategies, even tends not to use media. Reading learning models used by teachers such as assignment models, procedures *closure*, numbered heads and jigsaw.

Based on observations, it can be seen that, in the implementation of learning, students only read what is written on the board by the teacher, then copy it to the notebook, reread it in turns, or read the textbook on the teacher's instructions. There is no task to read other books or other reading media that can be accessed outside of school.

The learning situation built tends to be classical and there have not been many innovative efforts to overcome the shortcomings of the classical model. Teachers also still have limited understanding and ability in choosing learning models that can improve students' reading comprehension skills.

In the opinion of Lerner and Zipprich Mary Ann, and Stephane classify coping strategies for the difficulty of reading into two groups, namely strategies that aim to improve the ability to recognize and read smoothly, and strategies that aim to improve reading comprehension skills. (2).

Whereas according to Sutikno, experience proves that learning failure is one of them caused by the selection of an incorrect model or method. (3) Classes that are less conducive and the conditions of students who are less creative due to the determination of methods that are not in accordance with the nature of the material, and not in accordance with the learning objectives. The more appropriate the methods used by the teacher in learning, the more effective the achievement of learning goals is expected.

The introduction of various innovative learning models is an obligation for a teacher. With the various developments that are happening now, of course, it requires adaptation actions from the teacher to be able to carry out more effective learning. This is in line with the opinion of (4). that in language learning, today, there are many learning models available. In fact, many language learning models are adopted by other fields of study. However, why many Indonesian Language teachers are still having difficulties in varying the Indonesian language learning

model. Many of them only focus on lectures, discussions, and assignments.

In general, with a variety of learning development activities that are often followed by teachers, it gives an opportunity for teachers to be able to get to know various innovative learning models. According to (5), various learning strategies can be carried out to help develop the reading ability of students having difficulty learning to read, because the difficulty of learning to read is a condition of learning barriers that continue to stick, so one of them requires the right learning model. Therefore, teachers need to master and apply learning models that are appropriate to the characteristics of students having difficulty learning to read.

The lack of optimization of learning in children with learning difficulties is also evident in the teacher's lack of service in learning that is tailored to the characteristics and needs of the child. This is seen based on observations and interviews conducted by researchers that the teacher's strategy in dealing with children has difficulty learning to read only by giving additional assignments or homework assignments, which are actually not in accordance with the interests, learning styles, and thinking styles of students. The implications of this action make students not enthusiastic, lazy, not motivated to learn, and tend to get low learning outcomes.

There are several learning models that can actually be used to serve education for children with reading difficulties, one of which is the SAVI learning model. SAVI Learning is an acronym of Somatis (physical), Auditory (sound), Visual (image), and Intellectual (contemplative). (5). According to Meier, if a learning can involve all these SAVI elements, learning will take place effectively as well as attractively.

2 Literature Review

2.1. Research Concept Action

Research Action has more scope than classroom action research, because the object of action research is not only limited to the class, but outside the classroom, such as organizations, communities, and society. The knife of analysis from action research is that the system is not just a subsystem of so many series of educational problems. Educational research lately pays considerable attention to action research. This research is believed to be able to offer new approaches and procedures that are more promising and have a direct impact on the improvement and enhancement of the professionalism of education actors in managing the learning process.

Action research according to Mills (2003) is systematic research carried out by researchers, teachers, principals, advisors or stakeholders otherin the learning environment to gather information about the ways in which their schools

are run, how they teach and how well their students / students learn. Action research provides useful answers for teachers or educators in conducting studies in a school and provides valuable input for improving the quality of what has been done in real terms (Mills, 2003).

Action research according to Kemmis and Taggart cited by Denzin and Lincoln (2009) is a form of collective and self-reflective research conducted by participants in social situations to improve their educational and social practices, as well as their understanding of their performance, which includes a spiral self reflective cycle in the form of; plan a change, study and observe the process, review the process and consequences, then re-plan again, study and observe, review, and so on (Denzin & Lincoln, 2009).

While Suharsimi Arikunto, et al. Stated that action research is an observation of learning activities in the form of an action that is deliberately raised and occurs in a class together (Arikunto, Suhardjono & Supardi, 2008). The action is given by the teacher or by the direction of the teacher carried out by the learner. Furthermore Suharsimi also stated that action research is carried out through four main steps, namely (a) planning, (b) action, (c) observation, and (d) reflection (Arikunto, Suhardjono & Supardi, 2008). The four main interrelated steps in conducting research action is called a cycle.

Zuber and Skerrit suggested action research as a collaborative activity, an important independent discovery carried out by practitioners (teachers, school administrators) on important issues in the learning practices they carry out (Zuber, Ortrun & Sekerrit, 1996). They have problems and feel responsible for solving these problems through teamwork by running the cycle process as follows: (1). Planning activities, (2) implementing actions, (3) observations, (4) reflection. According to Susilo, in general there are four main stages in action research, namely: 1) planning, 2) implementation, 3) observation, and 4) reflection. (Susilo, 2007).

Action research is a trial of ideas in the form of practice in the hope that they are able to develop or change things, trying to have a real influence on certain situations. As Hopkins stated below: "Action research is trying to come up with ideas in practice with a view to improving or changing something, trying to have a real effect on the situation". " (11). Next Coghlan gives the understanding "action research is a participatory, democratic process concerned with developing practical knowing in the pursuit of human purpose, grounded in a participatory worldview". (Brannick, Coghlan, 2005). Based on the two meanings above, it can be concluded that action research is dynamic, namely the change in real activities in routine situations, and also an attempt to find useful goals for the benefit of life in the world.

Another definition described by Stephen Kemmis as follows:

"Action research is a form of collective self-reflective research carried out by participants in social situations to improve reasoning / rationality and fairness of their

educational practices and social practices as well as their understanding of their practices and to the situation where these practices are carried out " (11).

Based on some of the opinions above, it is implied that action research is actually based on a philosophy that there is self-awareness in humans to improve performance in the form of practice, realize lack of self, and certainly want to make improvements, and want something better .

2.2. Learning Difficulties

The term children with learning difficulties is quite diverse. This diversity of terms is caused by different expert perspectives. The group of medical experts call it the term brain injured, and minimal brain disorder and in the field of education there are those who call it the term educational handicapped. But the term that is often used by education experts in general is learning disabilities which are interpreted as "learning difficulties".

In etymology studies, the difficulty of learning to read is often called the term dyslexia. Dyslexia comes from Greek which consists of two words, namely the word dys and lexia. The word dys means not capable and the word lexia means reading. So dyslexia can be interpreted as a condition, a form of difficulty or inability to learn to read. (13)

Therefore, some experts explain the notion of dyslexia with the same concept. Mercer (Cecil, and Mercer-Ann , 1989), defines dyslexia as a syndrome of difficulty in learning components and sentences integrating components of words and sentences, and in learning everything related to time, direction, and time. Whereas according to Critchley (13), dyslexia is defined as: (a) a disorder in children even though conventional learning experiences fail to achieve language skills such as reading writing and spelling commensurate with their intellectual abilities, and or (b) a disorder which is manifested through difficulties in learning to read even though it obtains conventional learning, has adequate performance, and has socio-cultural opportunities. According to Myklebust and Johnson, there are several characteristics of children having learning difficulties, namely as follows: (1) experiencing deficiencies in visual and auditory memory, shortcomings in short and long term memory; (2) having problems in remembering data such as remembering the days of the week; (3) having problems recognizing the left and right directions; (4) have deficiencies in understanding time; (5) if asked to draw people it is often incomplete; (6) poor spelling; (7) difficult to interpret globe, maps, or graphics; (8) deficiencies in coordination and balance; (9) difficulties in counting; (10) difficulties in learning foreign languages. (14).

The characteristics of students having difficulty learning to read vary greatly depending on the nature of the problem. Saunders explained the characteristics of students having difficulty learning to read as follows: (1) reading slow, up

and down intonation, and word for word; (2) often reverse letters and words; (3) changing letters in words; (4) chaotic with words that are only slightly different, for example: smell, fruit, stone, blind; and (5) often guessing and repeating words and phrases. (15). Furthermore, according to Mercer, there are four characteristic groups of reading difficulties, which are related to: (1) reading habits (2) misunderstanding of words, (3) misunderstanding and (4) allergy symptoms (15).

More broadly the characteristics of dyslexic children according to Ekwall and Shanker have several symptoms related to cases of severe reading difficulties: (1) Reversal of letters and words; (2) Increasing the word has difficulty or does not improve after reading without sound (inwardly) or reading the first oral (orally), (3) the inability to store information in memory until time is needed, (4) difficulty in concentration, (5) inability to see relationships, (6) unstable emotions (labile), (7) impulsivity (carelessness), (8) poor eye hand motor coordination, (9) difficulty in sequencing, (10) inability to work correctly, (11) omission of words about phrases, (12) chaos related to reading verbally (oral), (13) weak auditory discrimination, (14) poor in syntax (grammar), stuttering, and interrupted speech break up / stop, (15) learning achievement in counting is higher than in reading and spelling and, (16) hyperactivity. (Yusuf, 2005)

Various reading errors that have been put forward can be used by the teacher as a reference in conducting identification and assessment, as well as being a reference in improving learning.

In the world of education the term used educational handicapped is because these children experience difficulties in following the educational process so that they need educational services specifically in accordance with the type and degree of difficulty. The special education service in question is also related to the strategy or approach to its assistance.

Children with learning disabilities are students who have normal or above normal intelligence but have difficulty with one or more aspects needed for learning. The difficulty is caused by the occurrence of mild dysfunction in the central nervous system or minimal brain dysfunction. According to the Federal definition put forward by Lovitt, what is meant by special learning difficulties is an irregular condition in one or more basic psychological processes that involve understanding or using language, oral or written that can be manifested in the imperfections of listening, thinking, speaking, reading, writing, spelling and / or doing mathematical calculations. This term also includes conditions such as experiencing difficulty / obstacle perception, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. This term does not include children who have learning problems caused by vision, hearing, or motor disorders, or mental retardation, or emotional disturbances, or those caused by environmental, cultural or economic disadvantages (Lovitt, 1989)

2.3. Inclusion Learning

Permendiknas No. 70 of 2009 states that inclusive education is a system of education that provides opportunities for all students who have abnormalities and have the potential of intelligence and / or special talents to participate in learning or education in an educational environment together with students in general. So in inclusive education students with special needs can learn together with other students in regular schools.

Inclusive education is an education service system that includes children with special needs learning together with their peers in regular schools closest to where they live. (16). Inclusive schools are schools that provide services with appropriate, challenging education programs. and accommodates all students in the same class. But the assistance and support provided by the teachers is tailored to the abilities and needs of each student so that the children succeed (17).

Inclusive schools are new developments in integrated education. In every student's inclusive school according to their specific needs, all efforts can be optimally served by making various modifications and / or adjustments, starting from the curriculum, facilities and infrastructure, teaching staff and education, learning systems to the scoring system. All students in inclusive education programs will get the same treatment in schools, which distinguishes students with special needs from getting a special assistant teacher. (16) Through inclusive schools students are taught diversity and tolerance among students, where they are taught to develop mutual respect for the physical differences between regular students and students with special needs in various aspects of life. (18). In addition, students with special needs in inclusive schools have the same rights and obligations as other regular students and do not get special treatment from the teacher, but they are supervised by a special assistant teacher.

According to Margaret E. King-Sears (2001) the purpose of curriculum modification and learning in inclusive classes is to compensate for intellectual, physical, or behavioral challenges and to create a learning environment that allows individuals with disabilities to use existing skills. (19).

Furthermore, according to Margaret E. King-Sears (2001), curriculum modification models in inclusion classes can be categorized into four types, namely: (a) accommodation, (b) adaptation, (c) parallel curriculum results, and (d) overlapping curricula (19)

Thus learning is an effort to create a condition for the creation of a learning activity that allows students to gain learning experience (20). Furthermore De Houwer explains learning functionally as a behavior change that results from experience (21). In line with the opinion above Baron et al. Defines learning as behavior change (22). Thus learning is a learning process that is planned and attempted to achieve a defined learning goal so as to cause changes in students.

Learning which is a learning process will only occur if students are active in the learning process. Therefore students are one of the important components in a learning process or can be said by students as the subject of learning. Every student has different learning characteristics and styles. For example, there are students who have intellectual abilities who need services to channel their talents, and there are also students who are less concentrated who have difficulty reading so that they need their own handling, but that does not mean they should only be served in schools with special needs, because there are schools that can meet the special needs of children children in public schools by changing curriculum and / or learning strategies. (23)

3. Materials and Methods

The general purpose of this action research is to overcome the problem of the learning process of reading in students the difficulty of learning to read, planning learning activities, carrying out learning activities and evaluating learning outcomes in students learning difficulties reading through the application of the SAVI learning model.

The specific purpose of this action research is to find out whether there is an increase in Indonesian language learning outcomes in reading learning difficulties in the fourth grade of Tomohon State Elementary School through learning that applies the SAVI learning model, and to determine the improvement of the learning process that includes learning, motivation, learning activities, student participation and social skills of students in learning Indonesian in class IV with the SAVI learning model.

The place of action research is planned at State Elementary School II in Tomohon City. This school was chosen because of one of the inclusive schools in Tomohon City. The time for conducting research from July 2017 to December 2018.

The method used in this study is action research. Action research provides useful answers for teachers or educators in conducting studies in a school and provides valuable input for improving the quality of what has been done in real terms.

This study uses action research methods with the Elliot model by combining quantitative and qualitative research (mix method) in the field of data analysis. Action research is aimed at increasing the effectiveness of learning which is the responsibility of the teacher, so that learning can be tailored to the needs and characteristics of students, especially students who have difficulty learning to read. This certainly will require commitment to participate and cooperation from all parties involved in the learning process in order to improve learning outcomes, especially students' reading skills.

4. Results and Findings

Based on the results of observations and interviews problems can be identified in: 1) the process of reading learning in students with learning difficulties that take place in class IV. 2) the characteristics of the type of reading difficulties in class IV 3) the initial ability and the difficulty of reading the understanding of students in class IV. The following is a description of the problems based on the results of observations and interviews;

Table 1. Prior Action Learning Process in Class IV

No.	Learning Components	Description of Problems
1.	Curriculum	Individual curricula have not yet been prepared. Students have difficulty reading
2.	Students	a. Having diverse characteristics includes the type of reading comprehension difficulties. b. Not yet given the maximum service specific learning model or service is still given classically
3.	Teacher	a. Teachers who teach 2 people, a teacher is a special tutor, but the learning process seems to have not been effective. b. Teachers dominate learning activities less involving student activity. c. The method used is only lectures and questions and answers. d. Less use of media and teaching aids e. Teachers Special counselors have not compiled individual curricula for students having difficulty reading
4.	Learning Methods	a. Learning methods are less varied and have not been adapted to the characteristics of students. b. The approach is still done classically, it has not varied according to the characteristics of students a. The teacher does not involve all the potential of students in reading comprehension skills
5.	Learning Media	a. Not yet utilizing learning media that are at school to the maximum b. There is no learning media created by the teacher to explain the concepts that will be taught to students.
6.	Students' parents	a. Not yet involved in the preparation of individual curricula for students having difficulty reading. b. Not yet involved in the learning process to help students who have not been able to understand reading c. In some cases there are still parents who are less communicative, making it difficult for the teacher to solve the child's behavioral and emotional problems in school.
7.	Assessment	There is no target for assessment of reading comprehension ability that is adjusted to the abilities and speed of students.

B. Cycle 1

1. Planning(Planning)

Planning activities in learning through the SAVI learning model for students having difficulty learning to read in class IV are arranged based on: 1) identification of the learning process in the classroom. 2) identification of behavioral characteristics and initial abilities of students. 3) identification of student reading difficulties, 4) curriculum / learning objectives and individual teaching programs. The components of these objectives are integrated and adapted to the material / subject matter on the theme being carried out.



Figure 1. Discussion for Preparation of RPP

2. Action(Acting)

Implementation of Actions in cycle 1 began on September 4, 2017. Activities were carried out in class IV with 24 students. The schedule for Sub Theme 1 lessons starts at 7:30 a.m. WIB until 11:30 a.m. WIB.

Activities in implementing these actions include: 1) Learning Implementation Preparation, 2) Learning Implementation, 3) recording the learning process and children's behavior during learning.

1). Preparation for Learning Implementation

In the preparation activities for the implementation of learning researchers and teachers prepare the position of tables and chairs that will be occupied by 4th grade students according to the groups that have been determined. In this group setting it is also delivered to students with reading difficulties to adjust and blend in groups. From this arrangement, it was seen that all students were happy and accepted about the group division.

In this preparatory activity it was also determined that the teaching was the mother of NP, accompanied by the Madam SL, while the researcher became a collaborator who would take notes, observe, analyze during the learning activities taking place, and provide input, direction after the learning took place. The second learning preparation activity is to prepare learning media that will be used in learning, namely cultural maps in Student Books.

2). Implementation of Learning

The implementation of mathematics learning in class IV

is thematic, in the implementation of learning refers to sub-theme 1 - Diversity of My Nation Culture. The activities in the implementation of learning begin by checking the readiness of students having difficulty reading in each group. One by one the teacher asks and analyzes the behavior of each student having difficulty learning to read before learning activities are carried out. Based on the results of the assessment, the discussion of researchers with collaborators at the beginning of learning was determined that in learning activities the control of changes in reading ability continued to be carried out with reasons to direct, guide, determine reading skills that must be improved.

After giving a positive suggestion the NP teacher invites students to be involved in each stage of learning that has been prepared at the beginning of the activity. The initial activity was carried out with apperception and a brief question and answer about the Beautiful Reading of Togetherness. In this activity the teacher asked the origin of a number of students, "Where did you come from?" Andrew answered "I am from Jakarta, ma'am," if where is Joshua from? ", " I am from Tomohon bu ". Well, our children should be proud that even though we are from different tribes, we are still one in this class. "Are you happy to have friends from various tribes?", All students answered: "happy mom". Now our material about "the beauty of togetherness", observe the cultural map images of differences in traditional clothes, traditional houses, traditional dances, and traditional musical instruments, in your book.

There is active interaction between teacher and students in exploring topics or concepts that will be studied. In this activity, there were some active students who answered, and there were two students who tended to talk. To motivate the DM and MM to be actively involved in the learning of SL teachers, assisted by researchers tried to shift their focus, so they returned to paying attention to Ms. NP. This activity lasts for approximately 10 minutes. After that the teacher explained the cultural map of the differences in traditional clothes, traditional houses, traditional dances, and traditional musical instruments, students listened seriously.

Then the core learning activities are carried out. In this activity with the material prepared, the teacher goes around to find out if there are students who have difficulty completing the task. The teacher tries to facilitate the difficulties experienced by students with reading difficulties in each group assisted by Ms. SL. Students are quite helped by the media prepared by the teacher. After that the students are busy completing the assignments in the student book, while discussing with their group friends.

The next activity is the students read the text "Know the Minang Tribe". The teacher assigned each group to read the text, AK students got reading assignments in group I, as well as FM students in group 3, then JT students in group 4, although with the help of friends in the third group the

students bravely were able to read text content reading to completion, which was greeted with applause from his friends. This situation makes them more confident and eager to be involved in further learning.

After reading the reading text, students are assigned to take important information from the text they read and write it in the form of a mind map. Each student makes their mind map in their respective books. At work, VP and JS students were seen, twirling the books they had, it seemed they seemed confused about what to write. Then the NP teacher approached them then gave guidance. Likewise with JN and GT students, they often ask questions about a number of paragraphs that they have not yet understood, the SL teacher then helps them by giving directions, steps they must write in the student book.

Before closing the lesson, students are directed to pack their own learning tools, namely: (1) taking their own bag, (2) opening the zipper bag; (3) insert a book, insert a pencil and other tools into a pencil holder, then put it in a bag, (4) close the zipper back of the bag. This activity is carried out in addition to familiarizing students with discipline, neat and orderly. It is also expected that children can carry out activities using their own bags without the help of others aimed at children's independence. After the child finishes packing the teaching and learning activities ends with giving questions to each student about the material that has been studied, for students who can answer the questions of the teacher, then they are allowed to rest.

3. Observation (*Observing*)

a. Observation of Learning Activities in Class IV

Observations before the action began on August 21,

2017 until August 29, 2017. While observations on the implementation of silkus 1 learning began on September 4, 2017 until September 26, 2017. After the implementation of actions in cycle 1 began to appear changes and improvements in reading learning, learning activities both on the aspects of the teacher, students having difficulty learning to read, the media, and implementing the SAVI learning model. Previously the teacher dominated the class more in this action activity. It was seen that the teacher began to involve many students to be active in learning.



Figure 2. Teacher when opening a Learning Activity

In other aspects, such as the use of media in learning, there has also been a fairly good effort. To find out the existence of this increase can be seen in the table of implementation of learning before and after the action as decomposed as follows:

Table 2. Implementation of SAVI Learning Before and After Actions

No.	Learning Components	Learning Activities	
		Before Actions	After Actions
1.	Curriculum	Individual curriculum for children	has not been compiled Already compiled individual curriculum for children.
2.	Students	<ul style="list-style-type: none"> a. Not yet got the appropriate learning strategy (still classical) b. Not yet facilitating student reading difficulties c. The child's initial ability has been developed with the material / material being studied 	<ul style="list-style-type: none"> a. Implement the SAVI learning model b. Start helping and guiding students with the potential SAVI learning steps students can maximize c. Continue to maintain and develop the child's initial abilities with the material / material being studied.
3.	Teacher	<ul style="list-style-type: none"> a. Two teachers teach 24 students b. The teacher is more dominating the learning activities and does not involve student activity c. The method used is lecture and question and answer d. Less use of media and props e. Have not compiled an individual curriculum for students 	<ul style="list-style-type: none"> a. 3 teachers (Ibu NP, and SL, including researchers) taught 8 students b. Teachers more facilitate learning and involve students in acquiring knowledge through active interaction. c. Using the SAVI method (with Somatic, Audio, Visual and Intellectual steps), which is varied with questions and answers, group discussions, assignments and exercises. d. Start using media in the class e. Already compile individual student curriculum.

No.	Learning Components	Learning Activities	
		Before Actions	After Actions
4.	Learning Methods	<ul style="list-style-type: none"> a. Only lectures and questions and answers b. The approach is always classical c. The stages of reading comprehension activities have not been clearly implemented d. Less involving students to interact with each other in learning material 	<ul style="list-style-type: none"> a. Already implementing the SAVI model, varied with group discussions, exercises and questions and answers. b. Already using a small group approach, and individually tailored to the difficulties and needs of students. c. Reading activities have begun to systematically start from Somatis, Audio, Visual, and Intellectual d. Already starting to involve students in interacting with other friends even though there are still many things that must be directed.
5.	Learning Media	<ul style="list-style-type: none"> a. Not yet utilizing existing learning media b. There is no learning media created by the teacher 	<ul style="list-style-type: none"> a. Already starting to use learning media in the classroom to help explain the material. b. Researchers and teachers together make mind maps more attractive
6.	Parents	<ul style="list-style-type: none"> a. Not yet involved in the preparation of individual student curricula. b. Not yet involved in the learning process to help students who have not responded to instruction in learning activities c. In some cases there are still less communicative parents to solve problems reading students at school. 	<ul style="list-style-type: none"> a. Already agreed with the preparation of individual student curriculum. b. Already starting to show his involvement in helping students, but still not maximal. d. There seems to be a little effort from parents to handle difficulties in reading students even though they are not maximal and still need to be monitored and reminded.
7.	Assessment	There are no assessment targets that are adjusted to the students' reading comprehension ability. The	assessment targets have been prepared which are adjusted to students' reading comprehension abilities

Although there was an increase in learning activities, there were still some obstacles in the implementation, namely:

- a) Not yet able to apply the SAVI learning model to the maximum because it still needs adjustments, especially for NP teachers who teach directly in class. For SL teachers, it is still necessary to establish a deep understanding of the steps of the model used in SAVI's learning. Adequate adjustments are needed to help students have difficulty reading in the classroom, although in some cases many have been helped, for example the teacher's ability to deliver material, the teacher's interaction with students in the class is quite good, and teaching preparation is quite good. But it needs to be strengthened again with the teacher's expertise in using the SAVI learning model, and teacher initiative in developing adaptive learning with students in the class.
- b) Characteristics of reading difficulties students who are very diverse in the class influence the adjustment that is not fast in understanding the reading, because

- at any time there are students who do not understand the contents of the reading, so they ask the group friends or assisted by the teacher. If something like this has happened and to keep learning going on automatically the teacher and other students must be able to help their friends who have difficulty
- c) Parents of VP, JT and JN still lacked support for students at home so that during the first cycle, the three students were enough to take the attention of the NP teacher and the SL teacher, during class learning.
- d) Although there are obstacles in the implementation of learning, but the support and attention of the school (principals, administrative staff, classroom teachers) is quite positive, making it easier for researchers to communicate the stages of the SAVI learning model, so that achieving the effectiveness of implementing the SAVI learning model can be maximized.

4. Evaluation

The results of the pre-test and post-test tests in the first cycle of the SAVI learning model in class IV are:

Table 3. Learning Outcomes of Students in class IV in cycle 1

No	Indicators	Student Names	Values	
			Pre-test	Post-test
1		AK	30	45
2		AA	40	50
3		AN	30	45
4		AM	20	60
5		AAP	30	60
6		CK	20	65
7		DM	30	55
8		FM	30	60
9		GT	20	40
10		JS	25	50
11	in Indonesian	JT	20	40
12		JK	30	60
13	3.1.1 Identify key ideas and supporting ideas for each paragraph of written text.	MW	35	65
14	4.1.1 Presenting the main ideas and supporting ideas of each paragraph of the written text in the form of a mind map.	MM	40	70
15		PM	30	65
16		PR	50	70
17		RM	40	60
18		RS	30	60
19		VR	20	55
20		JN	20	50
21		JA	40	65
22		PW	40	70
23		RL	30	60
24		AS	30	60

5. Reflection

The results of the implementation of learning in students with learning difficulties reading in class IV through the application of the SAVI learning model in cycle 1 are as follows:

- The existence of positive and conducive support from the School (Principal, Administrative Staff, psychologists, other classroom teachers), namely by giving freedom, facilities and infrastructure for the implementation of SAVI learning.
- The individual curriculum / individual teaching program is prepared for students who are fluent in reading in class IV in accordance with the initial assessment and applying it to SAVI learning activities.
- The teacher's ability to implement the SAVI learning stages is still not optimal, so that the implementation of learning still requires direction, guidance, and input from the researcher. Especially for intellectual processes that require emphasis so that students will reflect maximally.
- Because it just adjusts to the stages of the SAVI learning model, students who have difficulty reading

still need guidance to begin the initial to the end stages so that their potential utilization can be optimally implemented

- Lack of parental support for some students in grade IV which has an effect on children's readiness in learning and the smooth implementation of the SAVI learning model in class IV.
- While attending SAVI learning in class IV in general it can run smoothly. It's just that there are still two students with special needs who always behave hyperactively, thus slightly affecting the classroom atmosphere.
- Strengthening is always used in class IV especially to provide motivation to students and to shape reading skills in each student. Strengthening is given in the form of verbal and appreciation in the form of stars. For further learning this reinforcement is maintained.

5. Discussion

The Effectiveness of Learning in Thematic Learning in

Students with Difficulty in Reading Class IV Elementary School. The effectiveness of learning is part of the quality standard of education, so the effort to increase the effectiveness of learning is an effort to improve the quality of education. With the creation of quality education, the expected educational goals can be achieved. The initial step to achieving educational goals is the achievement of learning objectives which are referred to as learning outcomes. The first research findings prove that the application of the SAVI learning model is able to make effective learning so that students who have difficulty reading achieve optimal learning outcomes. the findings of this study also prove the findings of Hartati and Sismulyasih (2017) who concluded that the application of SAVI learning models assisted by audio visual was more effective than conventional learning models. (Hartati, Sismulyasih, 2017)

Talking about the effectiveness of learning created in this research is inseparable from the collaboration of stakeholders in this case, researchers, principals, class teachers, special teacher assistants who continuously and also the readiness of teachers in planning learning, preparing media and learning materials, and teacher's ability to manage class. This is like the research findings submitted by Rohmawati (2018) that,

"(1) learning is effective because of the conditioning that is done continuously between the vision and mission of the school in achieving quality education, (2) the existence of readiness of teachers in planning learning and teachers' attitudes and capabilities in providing exemplary in children, (3) the success of parents in achieving effective learning in children can not be separated from their parents upbringing influenced by socio-economic background of the family as well as the intensity of the time spent with the child, (4) the awareness of society in school success petrified organize effective learning, (5) the shape is done with the cooperation of stakeholders to establish communication and involvement in school activities. " (25).

The effectiveness of learning is part of the quality standard of education, so the effort to increase the effectiveness of learning is an effort to improve the quality of education. With the creation of quality education, the expected educational goals can be achieved. The initial step to achieving educational goals is the achievement of learning objectives which are referred to as learning outcomes. The first research findings prove that the application of the SAVI learning model is able to make effective learning so that students who have difficulty reading achieve optimal learning outcomes. the findings of this study also prove the findings of Hartati and Sismulyasih (2017) who concluded that the application of SAVI learning models assisted by audio visual was more effective than conventional learning models (24).

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stakeholders in this case, researchers, principals, class teachers, special teacher assistants who continuously and also the readiness of teachers in planning learning, preparing media and learning materials, and teacher's ability to manage class.

Application of the SAVI Learning Model Can Improve Learning Outcomes in Thematic Learning in Students with Difficulty in Reading Class IV Elementary Schools. Thematic learning that applies the SAVI learning model in this study is oriented to the learning process where students find knowledge through various physical activities involving various senses, such as observing plants in exploring their relationship with solar energy sources; observing visual texts to understand the benefits of solar energy in daily life; experiments in making windmills; and experiments to find the source of sound and how to propagate sound. The emphasis of learning on inquiry processes increases the courage and self-confidence and interest of students and is able to relate learning material to other subjects, as stated by Schrader, Reichelt, & Zander, (2018) that learning that emphasizes the inquiry process increases their confidence and interest in teaching science and that process-orientation in science provides a mechanism for integrating science with other subjects. The findings of this study are also in line with research findings (26) Muktadir & Agustrianto, (2014) which states that thematic learning provides many opportunities for students to be able to participate more and engage in learning activities, thereby increasing the courage and confidence of students who are seen in their enthusiasm in the learning process provide maximum learning results (27).

The assessment carried out in this study consisted of two, namely the assessment of the process and the assessment of learning outcomes, with the aim of evaluating the process of impacting the assessment of learning outcomes, that formative assessment or process assessment can be a powerful tool in regulating student learning approaches that lead to learning outcomes.

Learning outcomes obtained both in cycle 1 theme 1 "Beautiful togetherness" sub theme 1 "Cultural Diversity of My Nation" and cycle 2 theme 2 "Always save energy" sub Theme 1 "Energy Source" provides provisions for students who have difficulty reading in class IV Tomohon State Elementary School II and Tomohon GMIM III Elementary School to be successful in the world of education as well as in social life. Because through thematic learning that maximizes the function of the senses in the learning that has been passed, students understand the diversity of existing cultures, and also understand and understand their rights and obligations in utilizing energy sources in daily life.

The Learning Process That Applies the SAVI Learning Model to students who have difficulty reading. Difficulty in reading is one of the characteristics of students in inclusive learning in Tomohon Elementary School II and Tomohon Elementary School GMIM III is a challenge for

classroom teachers in an effort to make students understand the subject matter which is packaged in the form of stories. But through the application of the Somatic Auditory Visual Intelligence (SAVI) learning model that emphasizes learning ranging from moving limbs, seeing, listening and thinking able to make this thematic learning effective and lead students to achieving optimal learning outcomes.

Likewise, the adoption of the 2013 curriculum for the first time in North Sulawesi in the odd semester of the 2017-2018 school year is a welcome for teachers in applying thematic learning with learning content constituting material in various fields of study which are packaged into one theme. In thematic learning, the teacher must really design learning, provide media and teaching materials that are suitable for all fields of study and various instruments or rubric assessments. The implementation of the 2013 curriculum in thematic learning encountered several obstacles on the part of the government, institutions, teachers, parents and students themselves, as stated by (28) The obstacles in applying the 2013 curriculum on the part of teachers were the development of instructional media, teacher understanding, integration content from various subjects in thematic teaching, and IT literacy. The application of the 2013 curriculum in this study also has another challenge, namely the application of the 2013 curriculum in inclusive programs on thematic learning. Challenges or obstacles in inclusive programs such as those proposed by Fitria at all, (2015) are the lack of cooperation between class teachers and special assistant teachers. Learning from the constraints raised by Fitria at all, in this study, before carrying out the teaching of the teachers, training and equating perceptions about the application of the SAVI learning model in learning theme 1 "Beautiful togetherness" sub theme 1 "My Cultural Diversity" and the theme 2 "always save energy" sub theme 1 "energy source". The training activities are intended to assist and guide teacher understanding, assessment methods, development of learning media and integration of content from various fields of study .(29)

The skill of asking questions is really needed by teachers in applying SAVI learning because with the right questions both in written and oral form can direct and lead students to understand the subject matter. This is in line with the results of Judiani (2018) research which explains that the questions directed in the discussion foster curiosity of students while learning through experimental activities or observing nature (30).

In applying the SAVI learning model students are invited to find knowledge through learning activities that maximize the functions of the five senses and intellectuals so as to get better learning outcomes. Because the application of the SAVI learning model enhances process skills and also increases the percentage of student learning outcomes such as the results of the study proposed. For example, in finding ways to make sounds, by hitting the drums with your hands, plucking the guitar with your

fingers, blowing the flute with your mouth . Through activities that involve them in direct observation, students are invited to be critical and ask quality questions that themselves can help them find answers that are learning objectives that is the knowledge they must have

The application of the SAVI learning model in this study has the specificity of using a group approach in the learning process. Maximizing group functions in the thematic learning process with the aim of building knowledge is a step taken in order to anticipate the characteristics of existing students namely reading difficulties. This step is taken with the assumption that the learning target that must be completed in one day is that one learning can be completed. Because if the individual approach is used, there is a possibility that the targeted time is not enough, as found one material in one day. This is an obstacle because in one day the teacher may not be able to complete one material for normal students especially if in inclusive learning there are some students who have difficulty learning to read.

In addition to the group approach and the process approach taken to maximize the achievement of learning outcomes in thematic learning with the characteristics of students having difficulty reading in this inclusive learning program, visual text is also used as a medium and learning material. The visual text is intended to help minimize the obstacles students who have difficulty reading to understand the material diversity of my nation's culture and energy source material. The use of visual texts on learning that is set in a group approach is part of the use of multi-censorship education programs, such as the solutions offered

Effective learning is closely related to maximum learning outcomes, or in other words effective learning is able to provide maximum learning outcomes for students. Effective learning can be achieved by effective teachers too. The SAVI learning model in Thematic learning is the teacher known as an educator. Collaboration between class teacher and special teacher in implementing learning, conducting intensive mentoring, as well as assessing the thematic learning process theme 1 "The beauty of togetherness" sub theme 1 "Diversity of My Nation's Culture" and theme 2 "Always saving energy" sub Theme 1 " Energy Sources "provides optimal learning outcomes for students who have difficulty reading in class IV Tomohon Public Elementary School II and Tomohon Elementary School GMIM III. This collaboration between classroom teachers and special assistant teachers is in line with Hidayah's research findings (2011) that inclusive learning for students with special needs in this case reading difficulties require special treatment that is special teacher assistants.

6. Conclusions

Based on data analysis and discussion, the following

conclusions can be drawn.

- a. Thematic learning outcomes in students having difficulty reading grade IV Tomohon Public Elementary School II and Tomim Elementary School GMIM III can be improved through the application of the SAVI learning model.
- b. The learning process that applies the SAVI Learning Model is able to overcome the difficulty of reading students to understand the subject matter by learning from moving, observing, listening and thinking so that learning and learning outcomes improve.
- c. The effectiveness of thematic learning in students having difficulty reading grade IV SD Negeri II Tomohon and SD GMIM III Tomohon can be improved through the application of the SAVI learning model.

Acknowledgements

This research sponsored by Universitas Negeri Manado.

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Implementation of Problem-based Learning – Flipped Classroom Model in Chemistry and Its Effect on Scientific Literacy

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract This study aims to determine the effect of the problem-based learning – flipped classroom model and critical-thinking skills toward students' scientific literacy on the topic of reaction rates. The implementation of the problem-based learning – flipped classroom model is considered appropriate for developing students' critical-thinking skills and scientific literacy. The learning time in the classroom becomes more effective and through a problem-solving process, the students can develop critical-thinking skills, and it is hoped that students' scientific literacy can also develop. This research used the true experiment method with two-way ANOVA research design (2x2 treatment by level design). Seventy two students at one of the senior high schools in Jakarta become samples. Data collection techniques in this study are through tests of critical-thinking skills and scientific literacy tests. The results showed that the model of problem-based learning-flipped classroom influenced student's scientific literacy on chemical reaction rate. Each model gives different effect towards the students' scientific literacy, if it is applied to students who have different critical-thinking skills. The model of problem-based learning-flipped classroom is more effectively applied to the students who have high critical-thinking skills.

Keywords Flipped Classroom, Problem-based Learning, Scientific Literacy

1. Introduction

Along with the development of science and technology that grows fast in the 21st-century, it encourages education from other countries to develop a learning model that supports 21st-century skills, such as critical thinking and

problem solving, communication and collaboration, creativity and innovation, developing literacy of information technology and communication, ability to study contextual and then ability to literate information and media. Recently, learning model that supports 21st-century skills has already applied in learning activities in Indonesia. It can be seen from the use of some media based ICT, such as power point, flash player, learning video, website and others to support learning process.

The approach orientating the problem can impact that promises to chemistry learning in developing ability of high thinking, such as the critical-thinking skills that are followed by the development of students' scientific literacy (Marks & Eilks, 2009). The development of critical-thinking skills is also expected to improve students' scientific literacy. PISA 2015 expressed that scientific literacy is the ability to be involved inside the problems that concern science and scientific ideas, as a reflective society. Through scientific literacy, students can deeply understand about science and technology so that it can contribute to the environment. Scientific literacy also can be the bridge for the students to give the solution for the problems that happened in the environment, especially the problems that were concerned with science and technology so it can make them adapted well in the environment and then compete in the real world.

The flipped classroom model can be one of the learning models that are effective for chemistry learning in the class. It is learning activity that traditionally can be conducted in the class, now it can be conducted outside the class. Information delivery can be conducted by using media online, such as learning video (Lage, Platt, & Treglia, 2000). Next during the class, it will be conducted feedback activity, such as discussion, problem solving or tests (Osman, Jamaludin, & Mokhtar, 2014). The flipped classroom learning model can be supported by another learning model like problem-based learning that gives

positive impact, such as improving students' result study, motivation, activeness, and building the interaction between teachers and students, compared with traditional learning model (Tawfik & Lilly, 2015). Problem-based learning model is one of the learning models that are suggested in the implementation 2013 curriculum in Indonesia. It is one of the ways to build and teach by using the problem as stimulus and focus on student's activities. In problem-based learning model, students usually work to solve the problem in a group, meanwhile the role of teacher is presenting the problems, asking, and facilitating the investigation and students' dialogue.

Some researches show that the implementation of problem-based learning model impacts positively towards chemistry learning, like students' result study on electrochemical topic (Günter & Alpat, 2017). Problem-based learning model as active learning approach has a positive impact in improving result study, resolving alternative conceptual, and improving student's positive perception towards learning activities on an acid base topic (Tarhan & Acar-Sesen, 2013). It impacts positively towards the skill of the student's scientific process on the topic of solution and physical properties, improving student's access to use their knowledge, cooperate in groups, independent learning and the ability of solving a problem (Tosun & Taskesenligil, 2013).

The implementation of the model expected that science learning at school, especially chemistry, not only focuses on the product and delivery of content scientific learning, but also can be more focused on the process of science outcomes, for example, through discussion process and problem solving about science and technology in the environment. Therefore, students can improve skills of critical thinking and deepen understanding about science and technology so that they can develop scientific literacy.

2. Literature Review

Flipped classroom is a learning model that has been applied by many teachers in the world. The concept of the flipped classroom was submitted by Bergmann and Sams in 2012. They recorded classroom learning and provided online videos so students could watch and review subject matter easily. The strategy provides significant results that inspire them to use further online learning videos for learning before meeting in class. Some studies suggest that flipped classroom learning has a positive effect on student learning outcomes and has a positive impact on students' attitudes toward chemistry, where students can be directly involved and active in learning activities. (Olahanmi, 2017), (McDonald & Smith, 2013), (Eichler & Peeples, 2016).

According to Abeysekera and Dawson 2014; Bishop and Verleger 2013; Kim et al., 2014, there are several characteristics of classroom flipped learning models,

including the flipped classroom learning model facilitating students at lower cognitive levels outside the class, namely remembering (C1) and understanding (C2). Furthermore, developing a higher cognitive level when inside the class (inside class), which is applying (C3), analyzing (C4), and evaluating (C5) (Inga Hahn et. Al, 2013). Kong's research (2014) suggests that students have a statistically significant development in Information Literacy (IL) competencies and critical thinking skills through the creation of digital classrooms, using the Flipped Classroom strategy.

Flipped classroom learning models can be combined with or supported by other learning models such as problem based learning which turns out to provide better results, related learning outcomes, deeper student understanding, student motivation, student activity, and build teacher and student interactions, compared to learning models traditional (Traditional Classroom). (Tawfik & Lilly, 2015). Some studies on the effect of problem based learning report positive results on the learning outcomes (Günter & Alpat, 2017), addressing alternative concepts, and improving students' positive perceptions of learning activities in Acid-Basa (Tarhan & Acar-Sesen, 2013) material, positively impacting science process skills (scientific processing skills) of students on the topic of Solution and its Physical Characteristics in the General Chemistry II course, as well as increasing the level of students in accessing and using their knowledge, working in groups and working together, independent learning, and problem solving abilities (Tosun & Taskesenligil, 2013).

The implementation of the inquiry flipped classroom learning model increases students' motivation and students have a better understanding than students who are not using this learning model. (Paristiowati, Fitriani, & Aldi, 2017). The combination of classroom contextual-flipped learning models also has an impact on improving student scientific literacy, which means students can identify components in complex situations, apply both concepts and knowledge about science and can compare, choose, and evaluate the scientific evidence that is appropriate to respond to life situations (Paristiowati, 2019). Science literacy is seen by most education experts as something that is important for the welfare of society, namely as the ability of individuals to play a role in 21st century science and a world dominated by technology. According to (Deboer, 2000) scientific literacy allows people to live effectively in a rapidly changing nature (Celik, 2014). So, rather than focusing solely on memorizing knowledge, scientific literacy reflects a person's ability to apply scientific knowledge that exists in several contexts and situations in everyday life (Hahn et al., 2013)

3. Methodology/Materials

This research was conducted at one of the senior high

school in Jakarta. It used true experiment method with ANOVA design treatment by level 2x2. This research involved two groups; the experiment group was applied by problem-based learning-flipped classroom model, and the control group was applied by problem-based learning-traditional classroom model. The data of scientific literacy between two groups was analyzed based on the differences of students' critical-thinking skills. ANOVA design treatment by level 2x2 in this research is as follow:

Table1. ANOVA Design Treatment by Level 2x2

Critical Thinking Skills (B)	Learning Model	
	PBL- <i>Flipped Classroom</i> (A ₁)	PBL- <i>Traditional Classroom</i> (A ₂)
High Critical Thinking(B ₁)	A ₁ B ₁	A ₂ B ₁
Low Critical Thinking(B ₂)	A ₁ B ₂	A ₂ B ₂

Participants in this research are 72 students who were taken from grade 10th science program in senior high school in Jakarta. Sampling method in the research was conducted with the technical of simple random sampling. Students are divided into two groups that are applied for different learning model, problem-based learning-traditional classroom and problem-based learning-flipped classroom. The students in each group are also given the test to determine critical-thinking skills;

27 % of the highest score for the group that had the high critical-thinking skills and 27% of the lowest score as the group that had low critical-thinking skills.

The data in this research was collected by the test of scientific literacy and the test of critical-thinking skills. Before being analyzed, the data was tested for normality by Liliefors's test and homogeneity by Fisher test and Bartlett's test. There were four hypotheses that were tested in this research. The first hypothesis test (main effect) and second (interaction effect) were using technical analysis variance (ANOVA) two ways, meanwhile the third and the fourth (simple effect) were using *Tukey* test.

4. Results and Findings

The results of the hypothesis test are shown in table 2. The score describes that $F_c > F_t$ at a significant level $\alpha=0.05$; it means that students' scientific literacy with model problem-based learning-flipped classroom was higher than those who were given model problem-based learning-traditional classroom. The second result, the score $F_c > F_t$ at a significant level $\alpha=0.05$; it can be concluded that there was an interaction between learning model and the critical-thinking skills (dependent variables) towards students' scientific literacy (independent variable). It can be seen in figure 1.

Table 2. The result of hypothesis test using ANOVA two ways

Variance Source	ds	SS	MS	F _{calculation}	F _{table} ($\alpha=0.05$)
Between A ₁ and A ₂	1	313.60	313.60	10.94	4.10
Interaction A X B	1	1690.00	1690.00	58.93	4.10
In group	36	1032.40	28.68	-	
Total (T)	40	245294.00	-	-	

df: degree of freedom

SS: sum square

MS: mean square

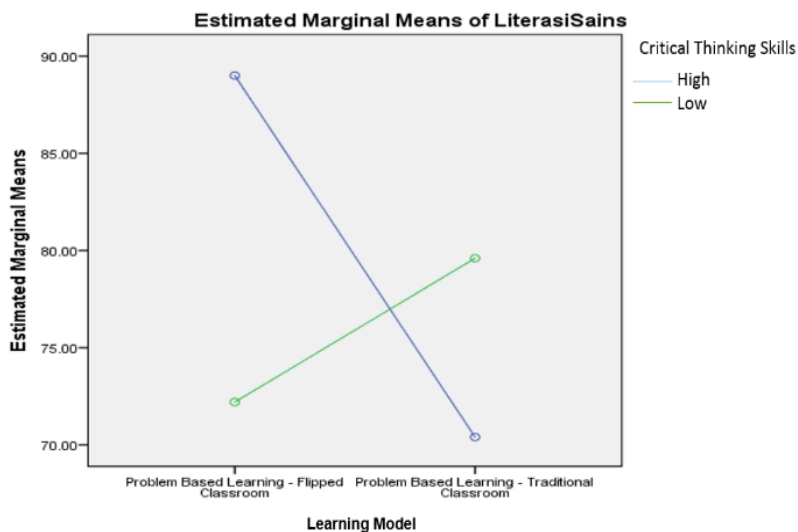


Figure 1. Interaction effect between learning model and critical thinking skills

Figure 1 shows that each learning model gives different effect towards student's scientific literacy, if it is applied to students groups that have different critical-thinking skills. The results of Tukey test are shown in table 3. In the students group that has high critical-thinking skills, the score describes that students' scientific literacy that is given problem-based learning flipped classroom model was higher than those who are given problem-based learning-traditional classroom model. Otherwise, student's scientific literacy that was given the model of problem-based learning flipped classroom model was lower than the model of the problem-based learning-traditional classroom model in the students group that had low critical-thinking skills.

Table 3. The result of hypothesis test using Tukey test

Group	Qcalculation	Qtable	Conclusion
$A_1B_1 - A_2B_1$	10.98	4.33	H_0 rejected
$A_1B_2 - A_2B_2$	4.37	4.33	H_0 rejected

The students' scientific literacy that is given the model of problem-based learning-flipped classroom is higher compared with that are given problem-based learning-traditional classroom model. It is caused, learning in the class can be more effective because the learning material has been given by the teachers outside the class through video of learning. Students can prepare themselves for the learning in class by watching video, and they can construct the prior knowledge before learning activities in class. Therefore, the practice or discussion in the class can be done more to involve the students in deeper learning and assists them to clarify misconception (Hwang, Lai, & Wang, 2015). It is the same opinion that flipped classroom reconstruct the environment in the class and the activities at home (Bergmann & Sams, 2012). In the flipped classroom, teachers can reduce the duration to explain learning material and increase the time for active learning, such as discussion and problem solving (Bishop & Verleger, 2013).

It is different from learning using problem-based learning-traditional classroom model. In this model, the teachers deliver the learning material in the class through direct instruction using media power point, then continued with giving the problem and student discuss to solve it. The model of problem-based learning-traditional classroom less involved the students directly to be active in deeper learning activities. Students who are given this model less have deep understanding about science and technology and can be the impact to the low scientific literacy. Some researches about the implementation of a model flipped classroom also show positive impact compared with model traditional learning, such as result study and student's behavior towards chemistry, making active learning, preparing students before learning in the class, and then assisting them in solving homework, preparing the exam, strengthening and clarifying the concept (Eichler &

Peeples, 2016; Olakanmi, 2017).

The result of the hypothesis test shows that there is the effect of interaction between learning model and critical-thinking skills towards the students' scientific literacy on a chemical reaction rate topic. The interaction proves that each learning model gives different effect towards students' scientific literacy if applied to students groups that have different critical-thinking skills. Scientific literacy has become one of the main purposes that should be achieved by the students. OECD states that one of the competencies that have special significance and relevance with scientific literacy is critical thinking. Students who have the critical-thinking skills are expected to be involved in criticizing the problems that happened around the environment, especially the problems about science and technology, and to give a solution of the problems. Critical thinking is the ability to solve the problems, collect and analyze evidence, and use analysis to decide. (Nargundkar, Samaddar, & Mukhopadhyay, 2014). The model of flipped classroom gets the cognitive level that is lower outside the class; it is to remind (C1) and understand (C2). Next, it is focused on the high level of cognitive during in the class, by applying (C3), analyzing (C4) and evaluating (C5) (Paristiowati et al., 2017). Another research shows that the approach of a problem oriented can impact promise to chemical learning in developing the ability of high-order thinking and students' scientific literacy (Malik, Paraherakis, Joseph, & Ladd, 1996; Marks & Eilks, 2009).

The problem-based flipped classroom learning models are good if applied to students who have high critical-thinking skills. Through the implementation of the flipped classroom model, students can obtain sufficient knowledge before starting learning. They have more time to do high-level learning in the classroom, and then it can increase their motivation and result study (Hwang et al., 2015). In the flipped classroom model, students who have high critical-thinking skills can apply their knowledge from videos learned at home and actively engage in deeper learning activities while in class, such as discussion and problem solving. Students can be trained to use high critical-thinking skills to solve problems in around the environment that is about science and technology so it is impacted to high scientific literacy.

5. Conclusions

The conclusion in this research shows that implementation of the right learning model, and consideration of the students' characteristics based on the level of critical-thinking skills, can give the positive effect to students' scientific literacy. The problem-based learning-flipped classroom model is more effectively applied to the student who has high critical thinking, while the problem-based learning-traditional classroom model is more effectively applied to the student who has low critical

thinking.

Acknowledgements

This work is supported by Universitas Negeri Jakarta and Ministry of Research, Technology and Higher Education of the Republic of Indonesia through research fund 2017-2018.

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Mandarin Students' Perceptions of Smartphone Applications in Mandarin Learning

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract The brilliant advancement of mobile technologies provides a vivid instructional approach which suits the millennial students where learning happens ubiquitously. Therefore, awareness that mobile-assisted language learning (MALL) encourages personalized learning is the focus. Smartphone, the most excellent creation has impressed everyone, and it offers enormous potential for integration into language learning. Smartphone applications (SA) enable students to learn nowhere, in the class or out of the formal class. However, the way of students perceive SA as the Mandarin learning tools have not yet explored broadly. Thus, this preliminary study aims to examine Mandarin students' perceptions of SA along with its usability, effectiveness, and satisfaction and the correlations of gender, course, and activities via SA against the items mentioned. A quantitative method was used through questionnaires distribution for data collection. 79 of undergraduates from an east coast university were chosen as the respondents to answer the survey. The survey was conducted in the 10th week of a 14 weeks Mandarin course. The collected data were then analysed using SPSS for the descriptive statistics. Two types of smartphone applications included dictionary based and teaching and learning based were identified. The statistics show that all the respondents consented that learning Mandarin via SA has influenced their language performance; task accomplishment and personal study positively. In addition, the students were engaging, satisfied and willing to continue using smartphones in their study. All in all, SA is a potential tool for MALL. However, students need guidance in ensuring the productiveness of SA in MALL.

Keywords Mobile-Assisted Language Learning, Smartphone Applications, Mandarin as a Foreign Language

1. Introduction

The world now is wireless connected. This brilliant technology and variety of mobile-device innovations have dominated human's life especially in the field of education. Previous research has shown plenty of alternative language learning tools are invented using mobile technology. Mobile devices offer the features of portability, social connectivity, context sensitivity, and individuality and all these characteristics might not be provided by using desktop computers. These advanced mobile technologies have made learning movable, real-time, collaborative, and seamless (Kukulka-Hulme, 2009; Wong & Looi, 2011). Accordingly, mobile devices have changed foreign language instructional methods and learning strategies (Abdous, Camarena, & Facer, 2009). Bergman (2012) and Fryer (2013) affirmed that language learning using mobile devices leaves a positive impact on students' test scores and behaviour. Numerous studies contended the use of technology in Mandarin language learning. They are Tian, Lv, Wang, Wang, Luo, Kam & Canny, 2010, Niu, Liu, Lin, Zhu, & Wang, (2014); Chang, Lan, Chang, & Sung, (2010) and they agreed that mobile technology affects remarkably on education, especially in learning foreign languages.

Today, smartphone is the latest invention in mobile technology which has gained popularity and attention of academia. Learning and communicating can happen ubiquitously in the hands of instructors and students. The influences proved by Bothun (2011), the mobile consumers will increase in coming two years as the apps will become more excellent. People use a smartphone for educational and non-educational purposes like managing

their information, reading, surfing the internet, communicating, doing research and, messaging and (Jubien, 2013). Learning via these mobile technologies is defined as mobile learning (m-learning) whereby learners can receive material anywhere and anytime through technology (Turkle, 2011). Guy (2009) interpreted it as electronic learning (e-learning) through mobile computational devices. Brown (2008) concedes that m-learning includes strategies, practices, tools, applications, and resources that support learning anywhere and anytime. Kee and Samsudin, (2014) said that mobile-technology helps teenagers perform learning efficiently. Students are called 'Digital natives' or 'net generation' as they are technological friendly and digitally fluent. Nowadays, younger generations spend most of their time on these devices for socializing or entertainment (Ally, 2009). Therefore, any tool that eases student in accessing languages will help them in their learning progress (Reinders and Cho, 2010).

In Malaysia, there is also a large board of study on technology usage in teaching Mandarin. However, the inability to converse Mandarin is caused by the traditional teaching method. The educators are dedicated and motivated in delivering materials to the students in short given time however that students are always lack of time on practicing their oral skills. Additionally, majority of Mandarin teachers in Malaysia still use traditional teaching methods, which focuses on translating texts and teaching grammar in class. All in all, instructors are focused more time in explaining and giving information about the language and correcting the learners' pronunciations well than providing chances for the learners to practice their speaking.

MALL is an approach that teacher can imply in this millennium era to cater students' learning styles and needs. Sandberg, Maris, and De Geus, (2011) as well as Chang et al., (2010) affirmed that traditional integration learning with the inevitable advance of technology has made the instructional process better either in both formal and informal setting. With m-learning, learners and teachers have more chances to practice the target language 'anywhere and anytime'. Although there are numerous studies, suggest benefits in using advanced technologies in language learning, the impact of mobile phones especially smartphones in learning Mandarin has not been explored widely (Chua, Ahmad Tajuddin & Goh, 2017). Most of the students do not know for what purpose they are using their mobile phone (Jubien, 2013). They should be guided to be benefited the portability, social interactivity, context sensitivity, and connectivity; of the mobile phone in their learning. Thus, this study would like to find out the respondents' experience with mobile devices and their smartphone usage in learning Mandarin. In addition, participants' perceptions of the effectiveness and satisfaction of using smartphones for Mandarin

language learning are also being investigated.

2. Literature Review

The purpose of this section is to provide a review of past research efforts related to Mobile-Assisted Language Learning (MALL) in foreign language. A review of other relevant research study such as MALL in learning Mandarin is also provided. The review is organized chronologically to offer insight to how past research efforts have laid the groundwork for subsequent studies, including the present research effort. The review is detailed so that the present research effort can be properly tailored to add to the present body of literature as well as to justify the scope and direction of the present research effort.

2.1. Mobile-Assisted Language Learning (MALL) in Foreign Language

In the last few decades, Kizito (2012); Chanprasert & Han (2013) have discussed the benefit of mobile phones in developing language skills. The use of short messaging service (SMS) could enlarge language learners' vocabulary. Meanwhile, the integrating tasks which focus on meaning can engage students in learning a foreign language should not be abandoned. Also, SMS can be used to motivate students to learn and enhance their vocabulary. Besides, learners are able to exploit SMS and other voice communication apps to practice new vocabulary via role-plays and short dialogues. This MALL approaches improve the effectiveness of group learning and enhance the quality of interaction during language learning as it offers features of shared tasks and real-time communication. Creating meaningful environment for students from different countries to practice their language and to get feedback instantaneously is still deemed to be vital.

2.2. MALL in Learning Mandarin

According to the most recent data, the number of smartphones will be exceeded to 1 billion and it is expected to double in the next three years in world-wide use (Yang, 2012). Plenty efforts have been made to cater the need of Mandarin language learners in communicating in tonal language around the world. An easy-to-use Chinese text entry is used to sustain the high penetration of mobile phones and SMS use among Chinese users. In addition, they have successfully invented two new solutions for Chinese pinyin text entry with a rotator as an input device. Also, Al-Mekhlafi, Hu & Zheng (2009) initiated Context-Aware Mobile Chinese Language Learning (CAMCLL) for international students via mobile phone. It is to help the students as a service guide when they are out of school for their real-world Mandarin

practice. CAMCLL benefits the students by informing them, via their mobile phones with proper sentences based on the contexts of time, location, activity, and learner's level. It is discovered that this approach has enhanced the Chinese language learning efficiency and effects for international students. The research shows that Chinese text entry has eased Mandarin user in searching all related Mandarin materials. How this Mandarin pinyin typing skill can enhance students' Mandarin is an interesting approach to enhance students' Mandarin learning.

Plenty software programs have been invented to fulfil the Mandarin language users' needs. Advancement of wireless and mobile technology has introduced a large number of programs or mobile applications in learning foreign languages. Mobile learning games (Tian et al., 2010) help to enrich learners' vocabulary and improve their knowledge of Chinese characters. The previous studies indicate that m-learning games can play an essential role in the learning Mandarin. Students can be guided to use the available attractive apps via smartphone which enables learning nowhere and anytime.

Learner-created content (Wong, Chin, Tan & Liu, 2010) in m-learning provides great potential of transforming language learning into a real learning process. Some students were assigned to take photos in real-life in the study then they are asked to construct sentences with the prepositions or idioms given using mobile devices. The result showed that the students were more active in the classroom or online discussion for their grammatical constructions.

From another perspective, several studies reported on attitudes towards using mobile devices in Mandarin learning (Wang and Smith's, 2013). Stockwell's (2010) and Osman and Chung's (2011) study combined mobile text messages with Wiki to promote cooperative learning. Stockwell (2010), based on the frequency of students' logging in to different systems, found that 60% of the 175 participants had never completed any tasks by using mobile phones with three participants (1.7%) completed all the vocabulary learning activities through mobile phones. Stockwell concluded that the main reason could be using mobile devices takes more time to complete a task. Similarly, Osman and Chung (2011) found that the students were not fond of using Wiki probably because few students were familiar with Wiki. On the other hand, the study of mobile reading and the acquisition of grammar revealed that the participants lacked any motivation unless the learning outcomes have a role in their grades or credits (Wang and Smith, 2013). To sum up, the three main reasons why students tend to be unwilling to learn Mandarin by mobile devices are: (1) the cost of employing the system discourages the students from learning; (2) students are not familiar with the mobile learning system; and (3) students lack motivation. Osman and Chung (2011) seemed to indicate that students would be willing to use the system if they were familiar with it.

3. Methodology

In term of MALL, instructors and learners are given a dominant way to practice the target language 'anywhere and anytime' (Geddes, 2004). No doubt, the effectiveness of smartphones in education can enhance students learning and performance. With these purposes in mind, this study utilized a quantitative research method in which the data was gathered through an adapted questionnaire (Chen, 2013). The survey comprised 24 questions where the first part is to find out the respondents' experience with mobile devices and their smartphone usage in learning Mandarin. The second part was regarding participants' perceptions of the effectiveness and satisfaction of using smartphones for Mandarin language learning.

3.1. Procedures

Recognizing the effectiveness of smartphones, this study intends to explore the students' perceptions, experiences and satisfaction regarding the use of smartphones in learning Mandarin. The type of smartphone and its applications are carefully explored. 79 undergraduates who are undertaking Mandarin language course students from a university at the East Malaysia were selected using purposive sampling technique. This technique is chosen as the sample was of being a convenience and they were accessible to the instructor at the same time as the researcher (Friedman, 2012). Participants were 67 females and 12 males from two courses: 20 students are from Communicative Mandarin and 59 of them are Mandarin Level 1 students. In pilot study, 30 Mandarin students as the relevant population from a nearby university were chosen to answer the survey. The Cronbach's Alpha calculated was 0.917 and, this has fulfilled the standard of reliability. Earlier, all participants were asked to download some Mandarin learning applications using their smartphones, so they can use them in and outside of the class. The questionnaires were then distributed to all the Mandarin students at the 10th week of learning. The questionnaire was distributed to the students in week 10 of the semester after they have some knowledge about Mandarin and smartphone applications. After they have answered the survey, the students are asked to screenshot all the apps they have been downloaded and using, then send them to researcher via their smartphones. From the actual answers given, instructors can adjust the teaching strategy to make the instructional process more effective and last longer.

4. Result

This section will present and discuss the results obtained from this research. It consists of experiences of MALL, smartphone applications, smartphone applications

in language learning and usability, effectiveness and satisfaction of SA.

4.1. Experiences of MALL

To what extent the smartphone applications usage has affected students learning experiences was shown in figure 1.

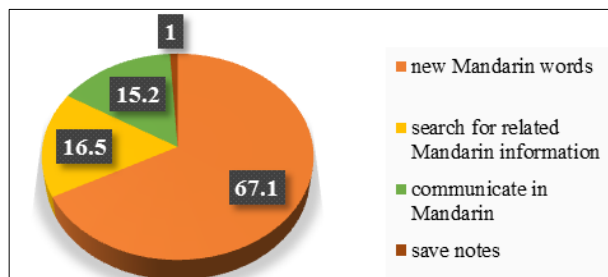


Figure 1. Smartphone Usage (in %)

Figure 1 above explains the different usages of smartphones reported by the students. All the undergraduates in the classroom owned a smartphone, and all of them claimed that they had used their smartphones to learn Mandarin. Majority of the respondents used a smartphone to look up for new Mandarin words (67.1%) since the convenience of m-learning helped them to personalize their learning activities. Meanwhile, surfing

related information about Mandarin (16.5%) and communicating with others using Mandarin (15.2%) were among the common usage of smartphones.

4.2. Smartphone Applications

The participants were asked to list down the smartphone applications that they have downloaded, which facilitate them in learning Mandarin. The responses were overwhelming since the students used more than two apps each to improve their proficiency. Some of the most common Mandarin applications are Pleco, 中 ENG Dictionary, Hello Chinese, Chinese, Talking Chinese, Chinese Lite, Pinyin, 中文 English, CN Phrase, Survival Kit, 24 HOURS Speak Chinese, A 文, CHINESE 字典, Chinese Skill, Learn Chinese Chinese, Learn Chinese, 英汉 English Chinese, 1200 字, and G 文. All the applications were free, and they came together with the audio function which was indicated by the picture of a speaker.

There were two types of applications identified. Firstly, dictionary-based (DB) which shows in Table 1 included Pleco, 中 ENG Dictionary, 中文 English, A 文, CHINESE 字典, 英汉 English Chinese.; and secondly, teaching and learning applications (TLA) which produce more Mandarin sentences like HelloChinese, Survival Kit, ChineseSkill, Tones, and others as presented in Table 2.

Table 1. Dictionary Based Smartphone Applications (in %)

SA	%	SA	%	SA	%
Pleco	42%	Google 文 Translate	4%	Chinese Dictionary	1%
中 Eng Dictionary	34%	eKamus 马来文字典	4%	English To Chinese...	1%
中文 English Dictionary	9%	English Chinese	3%	Chinese-English	1%
CHINESE 字典 Dict Box	4%	Kamus Mandarin	4%	A 文	1%
Chinese Mandarin Translate	3%	中文 Hanping Lite	4%	英汉 English Chinese	1%
快词英汉 词典	4%	Chinese Dictionary	1%	Malay to Chinese	1%

Table 2. Teaching and Learning Smartphone Applications (in %)

SA	%	SA	%	SA	%
Chineseskill	32%	Mandarin	1%	Mandarin Quizlet	3%
Survival Kit	28%	Learn&Play	3%	Pinyin Lite	3%
HelloChinese	20%	10000 Mandarin	1%	Chinese Pinyin	1%
Tone	5%	Number Trainer	1%	Memrise	4%
Chinese	14%	rainchinese	1%	Learn...	3%
Words	11%	Pinyin	4%	Listen	3%
Pinyin	11%	Chinese...	4%	Speak Free	1%
Chinese	3%	Easy Pinyin(En)	1%	Chinese-English	3%
巧宝识字	3%	Chinese Artword	1%	Hello Words	1%
Chinese Pinyin	1%	Easy Talk Chinese	3%	Chinese Flashcards	1%
Chinese...	1%	Strokes...	5%	Chinese Lite	10%
Learn Chinese	6%	LearnChinese	1%	Talking...	1%
Pin Pin	1%	Talking Translator	1%	Writer	4%
Chinese Primer	3%	Laoshi	16%	CN Phrase	3%

Table 1 shows there are 18 types of dictionary-based smartphone applications (DB) have been downloaded by the students to ease them in learning Mandarin.

Meanwhile, Table 2 shows there are 42 kinds of teaching and learning smartphone applications (TLA) have downloaded by the respondents during the ten weeks lesson. The TLA has the audio function, pictures, songs, and games.

All in all, there are numerous Mandarin smartphone applications which are free and charged which are very helpful in learning Mandarin. The apps will help the students to get the meaning of the Mandarin words, phrases and sentences, listen and practice in pronouncing them anytime and everywhere, whether they are in or out of the classroom. The respondents of this research have successfully installed and used more than two smartphone applications which including DBA and TLA on their smartphones. The students' preferences in using DBA are: Pleco Chinese Dictionary (42%) and, Chinese English Dictionary Bravolol Limited (34%). The students like Pleco and Bravolol dictionary because they are free and can be used offline. Most of them agreed that Pleco is the best DBA since there are many example sentences given in explaining each word and the words are coloured. Besides, the audio function enables participants listen and

practice the correct pronunciation of Mandarin words. While TLA smartphone applications are: ChineseSkill (32%), Survival Kit (28%) and HelloChinese (20%). Since they are easy to download and there are many attractive and interesting activities in learning Mandarin, so they were not able to express their preferences on which apps, either DBA or TLA, have been more helpful in their learning of Mandarin. Both applications have different functions in improving their proficiency.

4.3. Smartphone Applications in Language Learning

From the study, students' experiences regarding the smartphone applications usage were shown in figure 2.

Since the students were introduced to the different Mandarin applications of smartphone early of the semester, the students were more confident and familiar with them as they were easily accessible (27.8%) and the variety of interesting features made it easy for them to learn new Mandarin words (62%). However, some of the students informed that the smartphones can be useful, but it depends on the Mandarin smartphone applications (5.1%) and user (5.1%). Figure 2 shows all the participants consented that smartphone applications are beneficial for helping them to learn Mandarin.

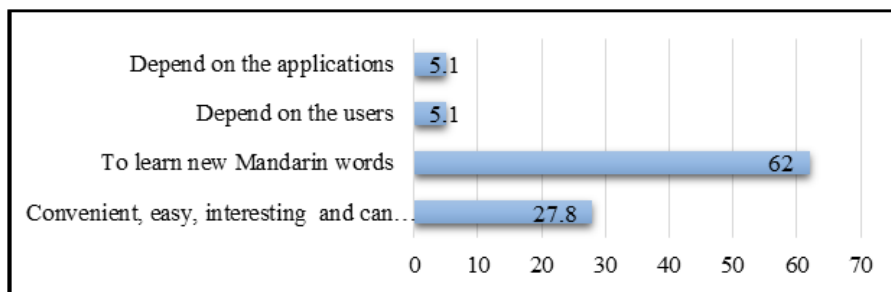


Figure 2. The usefulness of smartphone applications (in %)

4.4. Usability, Effectiveness, and Satisfaction of SA

A useful way to approach the evaluation of MALL technology is to address its usability, effectiveness, and satisfaction along with the learners' attitude (Azar & Nasiri, 2014). Thus, this paper also attempted to assess undergraduates' attitudes towards SA in learning Mandarin. The details were shown in table 3.

Table 3 shows the items of Mandarin language performance (question 1: assist Mandarin language learning; question 2: give greater control of Mandarin learning; question 5: increase outcome in learning Mandarin, and question 6: improve performance in mandarin), tasks accomplishment (question 3: more tasks done and 7: quicker manner), and students' learning (question 4: support their critical aspects; question 8: enhance their study effectiveness; question 9: ease their study, and question 10: be useful in their study).

Table 3. Item of Mandarin Language Performance, Task Accomplishment and Students' Learning

Mandarin Language Performance	
Question 1	assist Mandarin language learning
Question 2	give greater control of Mandarin learning; question
Question 5	Increase outcome in learning Mandarin
Question 6	improve performance in mandarin
Task Accomplishment	
Question 3:	more tasks done
Question 7	quicker manner
Students' Learning	
Question 4	support their critical aspects
Question 8	enhance their study effectiveness
Question 9	ease their study
Question 10	be useful in their study

The answers given in Figure 3 are regarding SA in learning Mandarin. 87.3% respondents agreed that the smartphones' portability and accessibility have facilitated them in searching and receiving plenty of Mandarin learning material and they can control over their learning anywhere and anytime and at their own convenient pace.

Additionally, the advance features of smartphones increase learning engagement as 74.7% of respondents agreed that smartphone applications increased their learning outcomes as well as improved their Mandarin language performance (73.5%). These applications not only allow autonomy, but also scaffold their learning. When they were given different tasks, respondents concurred that apps supported in locating and practicing critical aspects of language learning (65.9%) and they sought for materials and practice their Mandarin during their free time, which confirmed that the applications enhance their effectiveness in learning (83.5%) and to sum up using these apps, they could complete more learning tasks in a short time (78.5%). Students' answers in Figure 3 can be explained further on the term of language performances, task accomplishment, and students' learning.

In term of language performance which shown in Figure 3, more than 80% (86.1) respondents agreed that smartphone helped them a lot and gave them (74.7%) greater control over their learning of Mandarin language since the smartphones' portability and accessibility have facilitated them in searching and receiving plenty of Mandarin learning material anywhere and anytime and at their own convenient pace. This shows that with the help of SA, the respondents are taking charge on their own learning and this can be a tool to promote autonomy, especially with issues of large class sizes or exam-oriented teaching. Additionally, the technology of smartphones enables the Mandarin applications to have the audio function, pictures and games, which can increase learning engagement. All these features have eased them in their language learning since 74.7% of respondents agreed that smartphone applications increased their learning outcomes as well as improved their Mandarin language performance (73.5%). From the result, the significant differences for language performance is 0.36, which more than $\alpha \geq 0.05$; therefore, all the students consented that smartphone usage enhance their Mandarin performance based on language activities done via smartphone. This shows that any types of activities using smartphone will improve their learning outcomes.

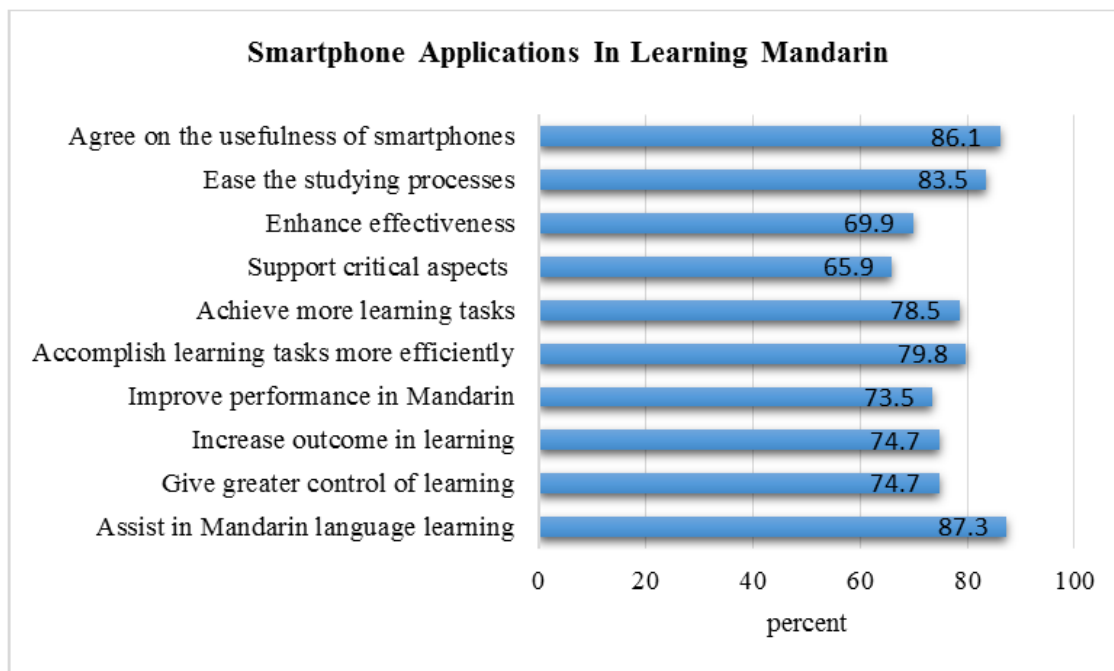


Figure 3. Smartphone Applications in Learning Mandarin (in %)

In tasks accomplishment, as smartphones have supported the students' critical aspects in learning so they (80%) are able to accomplish learning task more quickly and 79.8% that more learning tasks can be done. The significant difference for task accomplishment is 0.22 which indicated that smartphone usage has made students accomplish task easy and more quickly based on language activities done using smartphone. In sum, any types of activities using smartphone will help them in completing their learning tasks.

Last but not least, SA usage has impact students' learning process. All the participants discovered that smartphone applications could support their critical aspects (65.9%), ease their study (83.5%), enhance their study effectiveness (69.9%) and be useful in their study (87.3%). The significant difference of task accomplishment (0.43) showed the participants consented that any activity done using smartphone has influenced their study in positive way. The study also showed that there is no significant difference between students' study based on type of activities done.

In term of willingness in learning Mandarin via smartphone, the finding showed that more than 70% of students were willing to continue using a smartphone for Mandarin language learning. This result is agreeable to the amount in Figure 3 whereby the students consented that learning Mandarin through SA can enhance their knowledge as their effectiveness and interest in Mandarin is improved. There is also more than 70% (73.5%) of respondents claimed that they were willing to learn more about how to better utilize a smartphone to learn the Mandarin language more efficiently, and 83.5% students stated that they were happy to have learned more about

how to use a smartphone for Mandarin language learning. This provides definitive evidence from the earlier findings whereby the students found it was enjoyable and meaningful by using the smartphones in learning Mandarin and they are willing to explore the applications so that they can be more engaged in learning. Participants of the study thought that smartphones were comfortable, convenient and they can use them anywhere and anytime, which is agreeable with Geddes (2004). The respondents agreed that smartphone applications helped them in completing their Mandarin tasks and enhanced their performance not only in Mandarin subjects but also other studies. Most of them found it was exciting and willing to use smartphone continuously in learning Mandarin. They wanted to know more about the usage of the applications, and they were satisfied with the smartphone applications in enhancing their Mandarin language performance. These results suggest that smartphones are a potentially promising tool for MALL.

4.5. Discussions

This study explored how Mandarin students used SA to learn Mandarin language and to explicit their opinions on the newest superior mobile technology. The result shows that the respondents did not need any introduction on how to use the smartphone applications. The students are basically 'digital natives' and 'net generation' in which they are technological friendly and digitally fluent (Chua, Ahmad Tajuddin, & Goh, 2017). Based on the result of this study, the undergraduates agreed that smartphone applications were comfortable and convenient to use anytime and anywhere, and the findings relate closely to

Turkle (2011) and our recent series of studies in this area (Chua, Ahmad Tajuddin, & Goh, 2017) whereby the students found learning more interesting using smartphones. The paradigmatic development of the MALL framework for enhancing language teaching (Wong et al., 2010) has resulted plenty of smartphone applications appeared online for language learning. All the smartphone applications are complete with audios, pictures, songs and games. These advanced inventions are evident of the focus of MALL which is slowly changing from static content-based to mobile design-oriented studies. This will then lead to a positive motivation (Khong, Nurul Husna, & Norasrani, 2017; Chua, Ahmad Tajuddin, & Goh, 2018) in use of the MALL activities in enhancing their learning of Chinese as a foreign language.

Mobile-assisted in teaching and learning Mandarin should be developed and practiced by the instructors in their language classes (Chua, Ahmad Tajuddin, & Goh, 2018). This approach shows that students enjoyed exploring using SA via smartphone and they expressed willingness to use SA in future. This finding indicated that mobile devices had changed foreign language instructional methods and learning strategies with today's students (Abdous et al., 2009). Didactic learning in MALL is given a great potential in supporting teaching and learning by using the smartphone applications and this can be applied. Didactic learning is learning from the mobile educational material, including novel formats such as e-books and web caching. There were sets of pedagogical approaches can be referred by the instructors.

Even though the students' attitude towards smartphone applications is positive, it is essential for the instructor to manifest the learners a new technological affordances system (Yu, Sun, and Chang, 2010; Chua, Ahmad Tajuddin, & Goh, 2018). Regarding this, instructors need to guide the students to optimize the utilization of the smartphone applications in learning Mandarin which include variety activity design, autonomous and collaborative learning to be combined with their cognitive underpinnings of language learning to enhance their competence (Tan, Lim, & Kor, 2017). The overloading cognitive knowledge and information in the use of application might not bring in the actual use of the language in daily communication. In short, smartphone applications, as well as other mobile technologies should be further studied to benefit better for both the Mandarin teachers and students.

5. Conclusions

In conclusion, enhancing learning is the core in the use of any learning technology (Hasnah, 2016). Smartphone applications are thus ideal learning tools to enhance independent and ubiquitous learning in and out of the classroom and to enhance achievement (Muslaini, 2018).

The study has carefully explored the smartphone applications that respondents used. Most of the students used SA in finding new words, sentences regarding their meaning and pronunciations. They enjoyed using the smartphone applications, and they were fluent using them, and this method of learning has improved their language performance. The overall, majority of the students satisfied with using the smartphone as their Mandarin learning tools. All in all, smartphone applications and the guidance from instructors will be another way of teaching Mandarin to the students who have grown up using these advanced technologies.

Despite the contributions of this study to MALL, it is not free from limitations. One of the limitations of the study is lack of generalizability. The investigation was carried out with a limited number of participants. Although the results were revealing and of practical value to the authors and their institute, caution must be taken when the results are to be generalized to other settings. The generalization issue can be addressed by conducting more action research on MALL which focuses on how SA can be pedagogical applied in learning Mandarin and the relationship between MALL in Mandarin and performance regarding listening, speaking, reading and writing skills. For future studies, it is good to explore more on the influencing factors of mobile foreign language learning based on any model that available such as UTAUT Model (Gan, & Zhong, 2016) and etc. This is to validate the positive use of MALL in supporting and enriching the teaching of Chinese as a foreign language.

Finally, it is essential to understand the issue of smartphone applications in learning Mandarin and the students' attitude towards effectiveness and satisfaction of smartphone applications (Harwati, Melor, & Mohamed Amin, 2016a; Chua, Ahmad Tajuddin, & Goh, 2017). First, it is for the teachers to adapt MALL activities, especially how smartphone applications enable teachers to reduce workload and innovate teaching practices. This will then direct to the intention of use of MALL (Ali, & Arshad, 2016) in the Chinese classroom by both the instructors as well as the students. Besides, it can be an exciting tool for students because the teenagers in this mobile-technology era can perform ubiquitous learning efficiently. Finally, the Mandarin learners can practice their language after their Mandarin course anywhere, anytime and at their own pace and convenience.

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Evaluation of Principal Partnership Programs in the Directorate of Education Management - The Application of Kirkpatrick and Countenance Stake Evaluation Model

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract This research aims to examine and explore the phenomenon of the principal's partnership program developed by the Directorate of Education Personnel in order to increase the professionalism of the school principal. The principal's partnership program is one of the most important and strategic programs in improving the quality of learning in schools, especially in the dimensions of learning, learning supervision, managerial and entrepreneurship as mandated in Permendiknas No. 13 of 2007 concerning competency standards of school principals. This study uses a combination of the "Kirkpatrick and Countenance Stake Evaluation Model" in evaluating the effectiveness of the principal's partnership program in 2018. The participants of the principal's partnership program involved were 295 people consisting of SD 130 school principals, SMP 60; SMA / SMK 89 and SLB 16. This study employs "mixed methods" that is the combination of quantitative and qualitative procedures in answering research questions. The results of the study show that from the antecedent aspect of the Model Countenance Stake, partnership programs are beneficial for improving the quality of school principals and equitable distribution of educational quality. The results of the study on level 1 of the Kirkpatrick model show participants' satisfaction with the implementation of partnership programs. At the level 2 learning, it has shown the effectiveness of partnership programs especially in increasing participants' knowledge in aspects of learning, managerial, supervision, and entrepreneurship. At Kirkpatrick's level 3, the behavioral dimension shows the level of discipline and skills in supervising learning at school. In the Kirkpatrick level 4 model, it shows a fairly good impact on the attitudes of teachers, students and the implementation of the 2013 curriculum and the development of RPP. Overall, the two

evaluation models, "Stake's Kirkpatrick and Countenance have found the benefits of the principal's partnership program results.

Keywords Partnership Program, Kirkpatrick, Countenance Stake, Principal, Evaluation

1. Introduction

The principal's partnership program has been developed and implemented by the Ministry of Education and Culture's Directorate (Kinanti, 2016) of Educational staff from 2015 to 2018 with various modifications programs according to the experience and results of the monitoring and evaluation that have been implemented so far (Waylen et al., 2019). Partnership programs among principals whose schools are more qualified and schools that are less qualified in various provinces, districts / cities in Indonesia, are developed to provide a medium for transformation of the quality culture between schools (Liu, 2018). However, the problem of disparity in the quality of schools between provinces, districts / cities within the province and between schools within districts / cities becomes the main challenge that needs to be addressed through the principal's partnership program (Seeley, Witbeck, & Mulholland, 2018). School quality is one indicator of the principal's performance. This is in line with Permendiknas No. 13 of 2007 concerning Principal Competency Standards (NASIONAL, 2007) which include personality competencies, social competencies, managerial competencies and entrepreneurial competencies (van Dam, Schipper, & Runhaar,

2010). The principal's partnership program is essential and strategic as an effort to minimize the quality culture gap between advanced and disadvantaged regional schools. This empirical question then encourages the importance of conducting research in this dissertation. The principal's partnership program is part of the effort to improve the distribution of education quality and school quality through (Kaplan, deBlois, Dominguez, & Walsh, 2016) the top leadership of school organizations so that it can achieve a transformation of quality culture (Waylen et al., 2019) not only in schools but also in close partnership schools. Based on the consideration that the partnership program is a government program that has a noble goal to reduce the quality gap between schools, is widely implemented in various regions, has lasted several years, and there has never been a comprehensive research in this field; thus the authors are interested to focus her research on the principal's partnership program (Lau & Ng, 2019), namely the exchange of good practices and mentoring from more qualified schools to less qualified schools.

2. Literature Review

2.1. Research Question

The research problems that need to be answered in this study are:

1. How is the descriptive description of various (Weiss-Cohen, Konstantinidis, Speekenbrink, & Harvey, 2018) aspects of the principal's partnership program (the basic needs of the partnership program; the targeting of the partnership program; the selection of partnership participants; the facilitator, and the determination of the contents of the principal partnership program) to meet the principal's partnership program objectives?

2. How is the effectiveness of the principal's partnership program in terms of the dimensions of the Kirkpatrick Evaluation Model and the Countenance Stake model: Level 1 reaction (reaction); Level 2 (learning); Level 3 (Behavior); and level 4 results (outcomes)? (Kirkpatrick Partners, 2000)

2.2. Principal Partnership

The Ministry of Education and Culture partnership program which began in 2015 was carried out through (Roberts, 2018) the mechanism of exchanging partner principals with the impacted school principals and was named the Principal Leadership Comparative Study Program (Taylor, Goeke, Klein, Onore, & Geist, 2011). And it has been designed at the 2015 In Service Learning-1 and On the Job Learning Workshop and at the same time identifying and analyzing the implementation of plans to improve the leadership quality of principals after the In Service Learning-1 Workshop. The impact generated by

the intimate relationship between the school and the community (Cheng, Tung, Yang, & Chiang, 2019) through the effectiveness of the principal's leadership appearance, are: (1) increasing the active participation of the community in educational activities (Kvartiuk, 2019); (2) improve communication between the school and the community; (3) schools can improve school education (Chen & Feng, 2019) programs whose results are really needed by the community (link and match); and (4) the possibility of increased support from the community in the form of: funding, information and political support

2.3. Industrial Revolution 4.0

The American leadership method in the face of the Industrial Revolution (Nally & Brooks, 2018) Industry 4.0 is considered a new industrial stage where the integration of vertical and horizontal manufacturing (Frank, Dalenogare, & Ayala, 2019) processes and product connectivity can help companies to achieve higher industrial performance. (Dalenogare, Benitez, Ayala, & Frank, 2018)

3. Methodology/ Materials

3.1. Evaluation Model of Kirkpatrick and Stake

This evaluation study uses a mixed model between the Evaluation Model by Kirkpatrick (2006) and the Countenance Model by Stake. Kirkpatrick's model is used to evaluate the implementation of training or In-Service Learning as well as Countenance Stake to evaluate the overall program. In this model, evaluation is carried out through four levels or stages, namely stages: 1) Reaction; this stage aims to determine the level of satisfaction of participants in the implementation of a training, 2) Learning; this stage aims to determine the level of change in knowledge, skills and changes in the attitude of participants after training, 3) behavior; this stage aims to determine the level of change in work behavior of trainees after returning to their work environment and 4) result is an evaluation to determine the impact of changes in the work behavior of trainees on the level of productivity of the organization or agency.

Countenance Stake's model, according to Fernandes, has two main things, namely: (1) description and (2) judgments, as well as distinguishing the existence of three stages in program evaluation, namely: (1) antecedent (context), (2) transactions (process), and (3) output (outcomes) (Worthen & Sanders, 1973). Countenance Evaluation developed by Stake collects a series of information that is descriptive and contains elements of consideration from an object.

The use of Kirkpatrick's Model and Stake's Model in this study is showed in the following research design diagram.

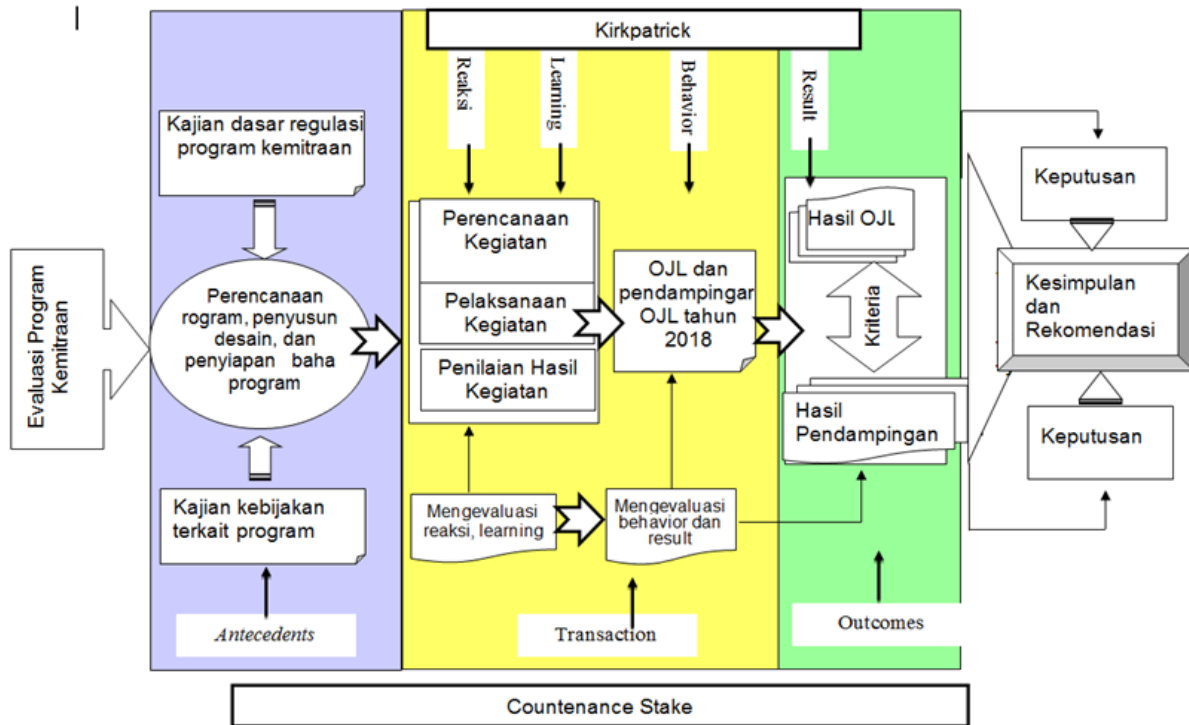


Figure 1. Research Design Quantitative and Qualitative Methods

This study uses a mixed approach that is the combination of quantitative and qualitative methods. Cresswell (2012) describes "a mixed methods research design as a procedure for collecting, analyzing, and" mixing " both the quantitative and qualitative studies of a series of studies to understand research problems" (Cresswell.W.John,2012). Furthermore, Cresswell.J.W (2002) states that "mixed methods" is a form of research design that is suitable for use when researchers intend to build the strength of both quantitative and qualitative data and complement in their analysis. This is supported by Miles and Huberman who stated that "when one combines quantitative and qualitative data, we have a very powerful mix" (Miles & Huberman, 1994; Cresswell.J.W., 2012). By analyzing both the results of quantitative research and quality, complex and intact images can be developed from the phenomenon under study.

To answer the research question number one about how the antecedent aspect (context) of the principal's partnership program, it requires qualitative data in the form of documents and words of the interview results and analysis according to the qualitative approach. However, to examine how the effectiveness of the principal's partnership program in terms of the dimensions of the Kirkpatrick level 1, 2, 3 and 4 models used data and quantitative analysis such as descriptive statistics and t-test to test the increase in knowledge of the learning process results. In this context, of course, interview procedures, in-depth interviews and various documents can be clarified and deepened in understanding the interplay between

phenomena.

According to Cresswell.W.J., (2012), there are generally four mixed methods designs: (1) the convergent parallel design; (2) the explanatory sequential design; (3) the exploratory sequential design and (4) the embedded design. In accordance with the four types of "mixed method" research designs, this dissertation employs "The Explanatory Sequential Design" because the researcher collects the data and analyzes the quantitative and qualitative data sequentially. Sequential stages are carried out by collecting data and quantitative analysis first and continuing with qualitative data collection and analysis. The design of the study using the "mixed methods" approach is described below.



Figure 2. "Mixed Method" Explanatory Sequential Design

3.2. Population and Samples

The principal's partnership program in 2018 was attended by 495 school principals, consisting of 200 partner school principals who came from better quality schools and 295 affected school principals from poor schools in terms of its quality. The population of the study was the principal program held by the Directorate of Education Staff that there were about 295 affected school principals consisting of elementary school principals of

130 people; Junior high school of 60 participants, and SMA / SMK of 89 participants and SLB of 16 participants.

The whole population of affected school principals was taken as a sample so that the total sample of this study was 295 principals. The whole schools come from several schools in the provinces which have the lowest national examinations in Indonesia established in the principal's partnership program.

3.3. Data Collection Technique

In answering research question particularly number one about the antecedent aspects of the principal's partnership program (Model Countenance Stake) which include the context of the basic needs of the partnership program, targeting partnership programs, selection of partnership principals, and the contents of the principal partnership program are carried out through:

Firstly, document Study Technique. Study procedures, document and policy studies are conducted to explore aspects of the partnership program development that cover policy background, targets to be achieved in partnership programs, basis for determining partnership program participants, mechanisms and procedures for implementing programs and the effectiveness of partnership programs in order to increase the professionalism of school principals .

Secondly, in-depth Interview Technique. That was conducted to explore more deeply and comprehensively of the document study so that it can produce more accurate views and various information or data obtained from the document review above. Interviews were conducted with stakeholders who are knowledgeable and involved directly or indirectly on partnership programs. Interviews were also conducted with decision-making officials and implementing program partners so as to obtain comprehensive information about the context of partnership policies and programs in order to improve the professionalism of school principals. The study of the context of the partnership program is an aspect that is emphasized in the Stake Countenance Model which is used as an evaluation model used in this dissertation.

Thirdly, Questionnaire Technique. That is to answer research question number two about the effectiveness of the principal's partnership program in terms of the "mixed Kirkpatrick model and Countenance Stake model", and a questionnaire was used to measure the perceptions and impressions of participants in education and training on the implementation of the principal's partnership program as an indicator of the principal's partnership program effectiveness. Measurement of effectiveness according to the two models reflects the evaluation of the level 1 reaction (Kirkpatrick) of the principal program participant and the reaction is a manifestation of the process of interaction between participants, facilitators, services, facilities and environment during the partnership program.

Fourthly, Pre-test and Post-test Techniques. Learning

dimensions obtained data from the results of pre-test and post-test for partnership material which included aspects of learning, managerial, academic supervision and entrepreneurship provided to participants of partnership programs consisting of elementary, junior high schools, vocational and high school principals. The learning dimension is level 2 in the Kirkpatrick model which uses tests on the knowledge of participants in the four aspects of learning, managerial, supervision, and entrepreneurship which consists of 50 questions developed specifically for the principal's partnership program.

Lastly, Assessment and Observation Techniques. Data collection for the behavioral dimension which is Kirkpatrick's Model 3 level and the results of the interaction process in the Model Countenance Stake, and the results of observations and assessments of the disability behavior of principals during the partner and impact schools in the first and second periods were used. Furthermore, the behavioral dimension uses an assessment of the implementation of academic supervision obtained by participants in participating in the partnership program. The application of skills and knowledge in academic supervision is an indicator of change including disciplinary behavior as presented by the Kirkpatrick Level 3 model and the realization of the interaction of the learning process according to Stake's Model Countenance.

4. Results and Findings

In accordance with the research questions to be answered in this study, there are four variables used as a measure in assessing the effectiveness of education and training according to Kirkpatrick's Model (1998) as follows.

a. The reaction variable includes several indicators about participants' perceptions of the service of the organizing committee and its indicators; readiness of supporting facilities and indicators; readiness and suitability of teaching materials and indicators; learning atmosphere and indicators; and presentation of material by the facilitator and the indicators. Some of the indicators are set out in 5 Likert scale choices as stated in the questionnaire.

b. Learning variable is to determine the extent to which participants gain knowledge, improve their knowledge in the fields of learning, managerial, academic supervision and entrepreneurship. The principal partnership participants were given 50 tests that measured the mastery of the principal's knowledge in the fields of learning, managerial, academic supervision and entrepreneurship. Through the measurement of the pre-test and post-test, it was intended to determine the absorption of the knowledge of participants towards the four fields of knowledge.

c. Behavior variables are to determine how many partners in the principal program partnership have behavior changes after they return to their respective schools. Thus

the behavioral dimension is more concerned with the question of how the principal's behavior in applying the knowledge and skills in their respective schools for the progress and development of the school. In this context the aspects of disciplinary behavior and indicators and the behavior of the application of learning supervision are indicators that are measured.

d. Result Variables are the overall results or impacts (outcomes) of the implementation of education and training programs. For the purposes of this study, the indicators measured are from various aspects of teachers'

perceptions about curriculum 13, student interest, development of lesson plans, teacher professional skills in learning, and pedagogical abilities of teachers in learning.

Summary of the overall level 1 reaction (level) variables, level 2 aspects of learning (learning), level 3 about aspects of behavior (behavior) and level 4 about results (results) or the impact of the principal's partnership program, according to the Kirckpatrick and Antecedence models from the Countenance Model Stake is presented in the following variable, instrument and indicator.

Table ... Instruments

Aspect	Indicator	Information
Planning/ Program Design	a) Program alignment with Government Nawacita 2015-2019 b) Program alignment with the Ministry of Education c) Suitability of the program with the target of the Ministry of Education's strategic plan	Antecedents
Workshop Planning	a) Suitability of the workshop program with participants' learning needs b) Suitability of the workshop program with the participants' learning abilities c) Conformity of the workshop program with previous experience d) The suitability of the workshop program with the participants' expectations towards the joined training program e) Suitability of the workshop program with new knowledge and gained experience f) Workshop needs analysis and review of program design are carried out	Antecedents
Workshop Preparation	a) The process of recruiting participants b) Registration and accommodation services c) Clarity of discipline and training objectives d) Letter of summons for participants e) Clarity of criteria and administrative advantages that are needed f) Schedule and plan program activities.	Antecedents
Lesson (Learning Plan)	a) Suitability of program structure and schedule of activities b) Readiness of syllabus and learning plan	Antecedents
Committee Services	a) ATK services b) Attendance and Journal Services c) Photocopy service. d) Services of providing workshop materials e) Refreshments	Level 1: Reaction
Cleanliness and comfort of workshop facilities	a) Cleanliness of the learning environment b) Cleanliness of bathrooms and toilets c) Cleanliness and comfort of the dining room d) Cleanliness and comfort of the hostel e) Cleanliness and comfort of classrooms	Level 1: Reaction
Readiness of supporting facilities	a) Availability of internet networks b) Readiness of library facilities c) Readiness of classrooms, study rooms, discussion rooms d) Availability of adequate lighting e) Availability of places for worship f) Availability of sports facilities g) Convenience and security of the environment of the activity site	Level 1: Reaction
Readiness and suitability of teaching materials	a) Practicality of teaching materials b) Readability of teaching materials c) Ease of access to teaching materials d) Suitability of teaching materials with the workshop e) The relevance of teaching materials to the needs of participants in implementing the OJL	Level 1: Reaction
Readiness and suitability of teaching materials	a) Suitability of teaching materials with the delivered material b) Complete coverage of teaching materials content	Level 1: Reaction
Learning Atmosphere	a) The approach used b) The portion of the task load from the facilitator c) Appreciation of the opinions of participants d) Empathy of facilitators to participants e) Similarity in treatment f) Alignment in the learning process	Level 1: Reaction

Aspect	Indicator	Information
Material presentation by the facilitator	a) Mastery of material b) Application of learning methods c) Systematic presentation d) Ability to respond to participants' questions e) Tools and media utility f) Language Usage g) The ability to build interaction in learning h) Consistency between the presentation of material and the learning scenario i) Use of time j) Participation of participants in learning	Level 1: Reaction
Attitude and Behavior of facilitators in the workshop process	a) Openness b) Hospitality c) Respect for participants d) Self control e) Appearance f) Cooperation	Level 1: Reaction
Knowledge of the principal	a) Learning b) Managerial c) Learning Supervision d) Entrepreneurship	Level 2: Learning
Discipline behavior	a) Discipline at the time of the OJL b) Discipline attitude during mentoring Phase 1 c) Discipline attitude during mentoring Phase 2	Level 3: Behavior
Implementation results (Supervision of learning)	a) Preparation of an academic supervision program b) Organizing the implementation of academic supervision tasks c) Preparation of supervision instruments d) Implementation of supervision e) Evaluating the implementation of academic supervision	Level 3: Behavior
Implementation results (curriculum management)	Short-Term Impact a) Impact of teacher perceptions on k13 b) Specialization of students c) RPP development d) Professional skills of teachers in learning e) Teacher's pedagogical ability in learning Long-term Impact a) Discipline of teachers and students in the class b) Academic and non-academic achievements	Level 4: Result/ Impact

Information:

K1 = Questionnaire 1 (for principals participating in the program)

K2 = Questionnaire 2 (for teachers from the program participating schools)

W = Interview Guidelines

D = Document Analysis Guidelines

O = Observation Guidelines

Data Analysis

Analysis of data to answer research questions about reactions as variables or dimensions of training effectiveness, descriptive statistical analysis was employed. Meanwhile, data analysis to answer research questions about learning variables employs the Non Parametric Statistical Test, the Wilcoxon Test. To answer the research question about the variable or behavioral dimension (descriptive behavior), descriptive statistical analysis is used in the form of a percentage or frequency of distribution that describes aspects of discipline and the behavior of the implementation of academic supervision carried out by the principals in each school environment. Furthermore, to answer the research questions about the results variable, statistical descriptive techniques are used in the form of distribution frequency and on average to find

out the impact of the partnership program on teachers, students and the atmosphere of learning in the schools of each principal participating in the partnership program.

5. Conclusions

Program evaluation at any time is seen as a process that is held independently when the program is established and has been operated so that it can make an improvement, increase accountability, and a deeper understanding of the phenomenon.

Acknowledgements

Ministry of Education and Culture of the Republic of

Indonesia.

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Developing a Hybrid Learning Strategy for Students' Engagement in Object-Oriented Programming Course

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract This research is conducted on the application of Object-Oriented Programming, aiming to examine improvements in engagement, performance, and interaction of students in OOP class through the application of hybrid learning strategies, and then compare them with traditional class methods. This research study sought to improve students' engagement and their performance using the OOP class and implement the hybrid learning strategy and compare students' interaction at a class that using hybrid learning strategy with traditional one. The hybrid learning strategy is a teaching strategy to improve students' engagement and performance from traditional class to Virtual Learning Environment and exercise programming inside the class through activities of learning. Changes in students' attitudes and perceptions were evidence. To evaluate before and after the test, a teacher created several units of the tests, and interview randomly. Observation of research, experiences, thoughts, and insights into the virtual learning environment was carried out at each learning. Quantitative and qualitative results revealed that the students favorably responded to the hybrid learning strategy and they had increased in their engagement and communication when both compared to the traditional class. Results of the study was found that $\text{sig. } t = 0.03 < \alpha = 0.05$, it was concluded that H_0 was rejected and resulted in the acceptance of H_a : $\mu_A > \mu_B$; this means that the average learning outcomes of students who take hybrid learning were higher than students who take part in learning activities using traditional learning. The students acknowledge the quality improvement in learning and using hybrid learning strategy in the class. Regarding academic performance, there are significant changes shown between hybrid learning strategy class and the traditional learning class environment.

Keywords Hybrid Learning Strategy, Object Oriented

Programming, Active Engagement, Academic Performance, Virtual Learning Environment

1. Introduction

The development of computer and internet technology is currently very rapid; it can be seen from the emergence of various kinds of services, which are turning into online services. The emergence of the development of the internet makes all the information needed can be obtained easily and quickly. In fact, Information Technology is a part of modern society's life.

Programmer is someone who can solve problems using a programming language. They have many abilities consisting of various levels, they are good at writing code, understanding algorithms and often working alone (Permana, 2016). The need for programmers every year is increasing, along with technological advances, but this is not accompanied by graduates from the Informatics Department who intend to become programmers (Capgemini Digital Transformation Institute survey, 2017). The Informatics Study Program is a study program that attracts many students, but their enthusiasm decreases rapidly in the second year because they have difficulty in learning Programming; programming courses have a huge portion, so if they have problems in this course, students will fail.

Object-Oriented Programming (OOP) was chosen in this study because OOP is very suitable for making large applications. OOP allows us to update or maintain applications without the need to overhaul from zero, and OOP is ideal for making team applications.

The results of the study of 81 respondents of Informatics students in the OOP course are as shown in table 1 below:

Table 1. Results of the questionnaire on current OOP learning based on Percentage

No	Items	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	Like Programming courses	26,8	31,7	32,9	4,9	3,7
2	Programming courses are too difficult	9,8	19,5	45,1	18,3	7,3
3	Programming courses are not interesting	31,7	7,3	30,5	28	2,4
4	Programming courses are boring	30,5	13,4	30,5	24,4	1,2
5	Teaching Lecturers are not proactive	13,4	17,1	35,4	30,5	3,7
6	The teaching method is not interesting	28	11	36,6	6,1	18,3
7	The lecturer does not evaluate the achievement of a material at each meeting session	32,9	13,4	7,3	22	24,4

Modifications and variations in learning at the higher education level are developed by developing computer and internet technology-based learning models. In the world of higher education, the background of the learners is very heterogeneous, meaning that the learners do not only come from secondary school graduates but also those who have worked so that with a background of very varied learners, the learning needs and styles of learners also vary. (Hampus Gunnrup, 2017) taught the concepts of Object Oriented Programming to children using a design science approach and the development of artifacts. The results show that teaching Object-Oriented Programming to school students can be done. Hybrid Learning is now a trend (Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014) which has been developed as a learning model in universities, and this model can be in the form of learning using the web, games, videos and more (McGloin, McGillicuddy, & Christensen, 2017). This model makes students engaged with learning materials that depend on how they are designed and delivered (IUCCEL, 2018). In general, hybrid learning is web-based learning with an open environment that can be accessed through the internet with the aim of facilitating learning and building learners' knowledge through meaningful interactions. Some studies show that the use of the right learning media can accelerate and enhance the interaction among teachers, learners, and instructors; so that the development of learning media becomes a necessity in learning. The choice of a hybrid learning model is to overcome the above problems because based on a survey of internet users. Indonesia occupies the fourth position concerning users who spend a lot of time on the internet.

2. Literature Review

Some studies show that the use of appropriate instructional media can accelerate and enhance the interaction among instructors, learners, and teaching materials. (Lucia M.M.Giraffa, 2013) stated that there had been a declining number of students majoring in Information Technology (IT) and Computer Science, due to the dropout rate from students who majored in computer science, because programming courses had a high failure

rate and became barriers for students, for years they tried to improve teaching methods. (Biju, 2013) There are problems faced by lecturers to teach Programming to undergraduate students. The students found difficulties in understanding the Object-Oriented concepts. Students who received procedural programming courses found difficulties in proceeding to OOP courses. They need time to understand Object-Oriented concepts. Various teaching approaches have been proposed to teach OOP. (Xinogalos, 2009). (Alhazbi, 2010) Students feel that the programming concepts difficult to understand; the students feel they lack skills to develop the right program. This situation reduces their motivation and causes many students to move on careers that do not require programming skills. Since lecture methods seem to be ineffective in teaching programming, then the different teaching approaches and methods have been studied to improve programming learning for novice students such as using games(Seng & Yatim, 2014), visualization, (van der Meij, van der Meij, Voerman, & Duipmans, 2017) active learning (Kahn, Everington, Kelm, Reid, & Watkins, 2016), and project-based styles (Tumewu, Wulan, & Sanjaya, 2017). Students assess that the use of e-learning in programming courses, as a supplement or as a substitute of lectures in class is to motivate, be easy to use, useful, efficient, exciting, and is a must (Handriyani, 2015).

The definition of learning is based on Behaviorism and Cognitivism, namely: The first is a change in behavior; the other is a change in mental representations or associations (Abbie H. Brown, 2016). Robert M. Gagne (J.Luterbach, 2018). Learning is a form of change that is shown in behavior changes through the experience of instructors and learners, from before learning and after learning process.

Learning is a system consisting of various components that are interconnected with one another. The components include learning objectives, learning resources, methods, media, and evaluation. Learning is any systematic and deliberate effort to create a process of interaction between students and educators and learning resources in a learning environment (Suparman, 2014).

The definition of Hybrid Learning (AECT, 2013) is the same as Blended learning, Blended learning is an instructional design where classroom and online (mediated) learning is integrated into educationally meaningful ways.

The term hybrid is often used interchangeably with blended though blended is the more commonly used of the two (Jared Stein, 2014). Course is called blended, if a portion of the content delivered online is thirty to seventy-nine percent; the course is web-facilitated if online portion is one to twenty-nine percent, and it is called as online if eighty percent of the content or more is through online (Khe Foon Hew, 2014).

According to the learning theory by (Bandura, 1977), that environment shapes behavior, and behavior shapes the environment; this is in line with the current student environment who are accustomed to using information and communication technology devices that have been connected to the internet so that learning materials to be developed are web-based. Teacher needs to implement instructional strategies that engage students in activities that build both cognitive and conactive skills (Michael Simonson, 2015).

Cone of experience (Davis, 2015) in Dale illustrates that the learning experience gained can go through the process of action or experience for yourself what is learned. Learning is divided into two types, namely active learning and passive learning. In passive learning, reading contributes to mastering material and memory by ten percent (10%), listening to twenty percent (20%), and seeing contribute thirty percent (30%). However, active learning, where when someone says, teaches, demonstrates, or discusses, it can give seventy percent (70%) understanding and memory of the material mastered, and if active in doing/applying knowledge, it contributes ninety percent (90%) to understanding and our memory of something.

Assessment of basic competencies is carried out based on indicators of achievement of competencies that contain one or more domains (Cognitive, Affective, and Psychomotoric) related to the cognitive realm, namely the ability to think, which includes intellectual abilities, ranging from the ability to remember until to solve problems.

Mentimeter is a web-based application, where lecturers can start learning with class polls to measure moods, warm-up material, or ask essential questions to students. Use the Priority Action Matrix to determine which skills are taught first (engagement students in planning learning) and do a quick assessment using the quiz feature to check mastery of concepts anonymously. Lecturers can also use Word Cloud to brainstorm a topic or a solution to real-world problems. Group discussions using questions related to scientific themes or discoveries can be easily implemented with this application (Davinda L.Hill, 2017).

The definition of Educational Technology based on AECT in 2004/2008 is "a study and ethical practice to facilitate learning and improve performance by creating, using, and managing various sources and processes." Educational-Technology is a complex and integrated process that involves people, procedures, ideas, tools, and

organizations to analyze problems, find ways to solve the problem, apply, evaluate, and manage the resolution of problems related to all aspects of human learning.

3. Methodology

The research carried out is R & D research because it fulfills the four main features introduced by Borg and Gall, namely conducting preliminary studies to find information about learning products to be developed, developing products based on research findings, conducting field trials of products developed, revise the product based on the results of the trial so that it becomes a useful product that answers the need. Borg and Gall (Januszewski, 2001) define R & D research as a series of processes that must be carried out in developing and validating educational products, and how to build research steps in the field of educational technology.

3.1. Participants

This study uses two (2) classes, namely the Hybrid class consisting of thirty-five (35) students and Traditional class consisting of thirty-five (35) students who took OOP courses in the 4th semester of the Informatics Engineering study program. (Siti Zuraidah Md Osman, 2014) This study aims to determine the lecturer and students' perceptions and their achievement between two learning methods, and a traditional class and a hybrid class.

3.2. Sampling Procedure

In this study, students who took a hybrid class and face-to-face (traditional) class were taken randomly 35 face-to-face and 35 hybrid class, from the number of students applying for hybrid classes and face-to-face classes.

3.3. Research Design

This research uses the Action Science Research Design (Kevin R. Clark, 2015), (Norton, 2009) to collect quantitative data and qualitative data to assess the impact of the learning process that uses Hybrid Learning class and those who use face-to-face class (traditional class). Quantitative data comes from pre-test and post-test. Qualitative data comes from interviews with students, observations, and discussion group sessions. According to (Creswell, 2012) the mix method approach is useful for getting a deeper understanding of research.

3.4. Procedure

Hybrid Teaching Model and face-to-face in OOP courses are implemented in one semester. To increase students' engagement in OOP learning, hybrid classes use

also a combination of face-to-face, namely, in a computer laboratory, lecturers teach practicum to make applications with OOP, and through online at VLE in Moodle, students learn by reading learning content as pdf file, watching video, and working on the questions in the form of online program code to understand logic and to analyze problems with code combat, code.org and digihub application; when the material in one session has been studied, the student uses the Mentimeter or kahoot application as an assessment, so that the lecturer is easy to monitor the results of the learning that has been done using mentimeter application. The mentimeter application is used for pre-test and post-test, because the mentimeter application is very interesting, real-time and easily monitored by students and lecturers.

For face-to-face class, the learning process is done in class, lecturers teach theory, and in computer laboratories to make programs, after finishing studying the material in one session, students working on test questions using the Mentimeter application before and after a test, because the Mentimeter application is interesting, real-time and monitored easily by students and lecturers. The results of each assessment session that uses Mentimeters in hybrid classes and face-to-face classes were analyzed whether there was material at one session. One hundred percent (100%) students understood, mix of students understood and zero percent (0%) of students did not understand; this was very useful for making decisions whether the previous session needs to be repeated.

3.5. Instrumentation

The instrument in this study used the Student Perception

of Instruction Questionnaire (SPIQ) to compare hybrid learning with face-to-face learning (Muniandy, 2017) . In his study, Muniandy used instruments to measure the effect of using technology in improving students’ learning and engagement in the learning process.

3.6. Field Test

Field tests were conducted before the adoption of a hybrid learning model, to assess the feasibility of interview instruments and focus group discussion (FGD) questions. Evaluation of instruments is carried out by experts. Experts are asked to determine whether the questions asked are obvious, the language is appropriate, open and in accordance with the research objectives. The feedback needs to simplify words in a number of questions, so students understand what is meant in the question.

4. Results and Findings

Our approach uses mixed-learning activities with three main phases. Figure 1 consists of (i) Observation of the OOP software development process, (ii) Application of problem-solving tasks with guided instructions, and (iii) Tasks of Autonomous Problem-Solving.

The blended-learning activity involves activities that use online learning resources and students’ interactions with VLE. Engaging the students and sustaining their interest during online learning, it proves to be one of the challenges faced by educators to teach the new generation of learners. A virtual learning environment is used in figure.2 as a hybrid-learning platform.

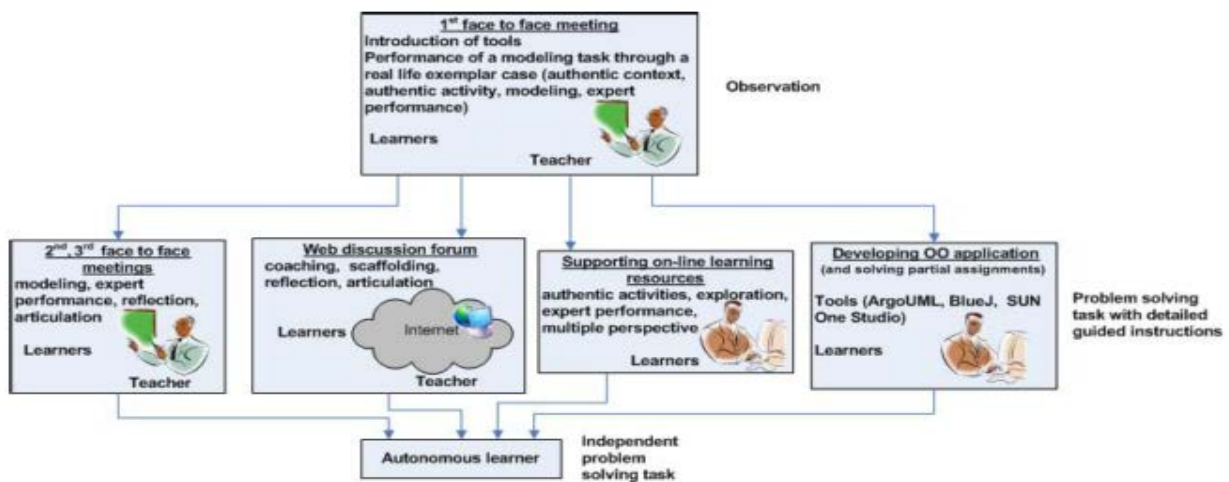


Figure 1. Phases and learning activities of the Proposed Learning for OOP (Yannis Psaromiligkos, 2007)



Pemrograman Berorientasi Objek

Matakuliah ini berhubungan dengan sikap, pengetahuan, dan keterampilan yang dibutuhkan dalam membuat perangkat lunak aplikasi dalam Bahasa Pemrograman Berorientasi Objek



Heni Jusuf
Universitas Nasional

Figure 2. Virtual Learning Environment (VLE)

4.1. Quantitative Results

The result of the quantitative analysis of this study is to test whether hybrid-based learning is better than traditional learning. To do the analysis, the researchers tested the hypothesis as follows:

Mathematical hypothesis

Ha1: $\mu A \neq \mu B$

Ha2: $\mu A > \mu B$

A: Hybrid learning

B: Traditional learning

Researchers used 35 samples to test the hypothesis above that had been taken randomly and had followed the learning activities carried out in the experiment.

The results of statistical analysis using SPSS 22 with the results of the analysis as a Figure 3.

Group Statistics

	grub	N	Mean	Std. Deviation	Std. Error Mean
nilai	1.00	35	74.1943	13.00206	2.19775
	2.00	35	67.7971	11.20589	1.89414

Figure 3. Statistical Analysis

Ha1: $\mu A \neq \mu B$: The average value of Hybrid class tests with Traditional class is not the same. The hypothesis is valid based on analysis results at the table above where the mean value of the Hybrid class is higher than the mean value of the traditional class, which is $74.19 \neq 67.79$

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
nilai	Equal variances assumed	.180	.673	2.205	68	.031	6.39714	2.90136	.60757	12.18671
	Equal variances not assumed			2.205	66.550	.031	6.39714	2.90136	.60529	12.18899

Figure 4. Table t

The hypothesis tested using Table t in figure 4 is Ha2: $\mu_A > \mu_B$ that is the average learning outcomes of students who take hybrid learning is higher than students who take traditional learning activities. From the Table above, it obtained a significant value of t of 0.031, using the criteria of a Significant Level of Error that is $\alpha = 0.05$, then it can be concluded that the Significant Value t is smaller than the limit value of error $\alpha = 0.05$. The hypothesis acceptance criteria in this study are H0 accepted if $\text{sig.t} > \alpha = 0.05$. From the results of the study, it was found that $\text{sig.t} = 0.03 < \alpha = 0.05$, it was concluded that H02 was rejected and resulted in acceptance Ha2: $\mu_A > \mu_B$ means that the average student learning outcomes following hybrid learning were higher than students who followed traditional learning activities.

4.2. Quantitative Result

The results on the feedback from the students of "f (N=35)" on the items that using the "5-point Likert scale" are shown in Table 2. Almost all of the students agreed that using VLE for hybrid learning provided several advantages, for example, instruction and navigation are easy to follow, the topic is easy to understand, and an online assignment was easy and useful for self-assessment and revision before the examination. These quantitative results are consistent with the comments of the students that VLE is a good learning system that helps us to refresh our memories at the module taught in class. The Mentimeter application on

VLE is an excellent tool for revising. It provides immediate feedback that we found very helpful, the interactive method that makes it easy for us to remember, understand and apply what we have learned, and overall, the Mentimeter application gives us an exciting way to make revisions. These advantages of the Mentimeter application are significant in education as part of the learning process of the students.

Results of the statements were indicative of a satisfactory student perception with hybrid learning in compared the traditional learning

Analysis has been carried out on 70 students who are currently taking OOP courses in table 3, namely hybrid classes consisting of thirty-five (35) students, and traditional classes consisting of thirty-five (35) students. There are nine (9) questions that were asked in the survey to get students' opinions about the subjects they took; it can be seen from the results that around one hundred percent (100%) of respondents strongly agree with Hybrid Learning lectures, particularly when involving the use of applications such as Moodle, code.org, YouTube, Mentimeter, and Kahoot as learning media.

The following keywords were found repeatedly in interviews and FGDs: Actively engaged in learning, better learning in class, the class is different from other class; interesting, the content is easier, direct learning, helpful, learn to be independent, learning individually. The following keywords were also found: teaching that innovative, interaction, more communications with peers and teachers, more participation, and technology.

Tabel 2. Feedback from student by percentage on VLE

No	Items	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	Log-in to VLE Moodle was easy	82	16	2	0	0
2	Moodle features were flexible to use	81	16	3	0	0
3	Instruction and navigation easy to follow	62	33	5	0	0
4	Understanding of the topic	55	40	4	1	0
5	Help in Self Study	56	35	8	1	0
6	Online assignment was easy					
7	Useful for revision before examination	50	40	5	3	2

Tabel 3. Student Survey by Percentase

No	Items	Hybrid Learning	Traditional Learning
1	Overall, this was an excellent course	65	35
2	I gained a good understanding of concepts	87	13
3	The clarity of instruction was good	89	11
4	I will use that I learn	54	46
5	I deepened my interest in the subject matter of this course	88	12
6	I was motivated to do well	98	28
7	I am confident in my ability to understand and apply concepts learned in this course	95	5
8	I find online class delivery of accounting materials at least as effective as traditional in-class delivery	95	5
9	I find online class delivery is more effective than traditional in-class delivery	100	0

4.3. Active Engagement and Learning

Results for the students commented that hybrid learning encouraged active engagement more in OOP course. All of the participants in the FGD mentioned how they had experienced increases in the classroom to participate when it compared with the classroom before hybrid learning. Notably, the student had acknowledged their passive interactions during lectures and limited communication between their teacher and other peers before hybrid learning.

4.4. Class Time and Structure

When students compare traditional classes with hybrid

classes, they feel hybrid classes are more interesting, because students can learn the learning material first, including watching videos, doing quizzes, while in traditional classes students just listen lecturers' lecture in class, which makes students feel bored. Some students commented they pretended to pay attention when the lecturer was teaching, even though at that time they were thinking about something else. The FGD session revealed that students get advantages with hybrid learning because they can repeatedly learn in VLE when they do not understand a material; this indeed cannot be obtained from traditional class students. Figure 5 is a VLE instructional design for hybrid classes.

Master Schedule

Date	Topic	Subtopic	Learning Activities With Due Dates					
			Reading Assignment/ Video Presentation	Homework	Self Evaluation Quiz	Synchronous Session	Lab Session	Exam
Week #1	#1	1#	Vol1 #P Video#	HW #1 Book Vol1 #p	Quiz #1	In / off Class Session Discuss about#	-	-
		2#						
		3#						
Week #2	#1	1#	Vol1 #P Video#	HW #1 Book Vol1 #p	Quiz #2	In / off Class Session Discuss about#	-	-

Figure 5. VLE Instructional Design

4.5. Quality of Teaching

The results of interviews with students have revealed improved quality of teaching in Hybrid Learning. In particular, students compare hybrid classes with traditional classes. Some students do not feel direct instruction during online classes. On the contrary, students think that the hybrid teaching model is more effective and can be applied because of the variety of teaching methods incorporated in it, such as lesson content that is fully available, both text and video, direct assessment, independent assignment, group assignments, and collaborative based learning. Students thought previously that effective teaching was listening to lectures and taking notes; however, after experiencing hybrid learning, they gained a new understanding concerning effective teaching. At the end of learning, the students preferred the class in which various learning methods were used. Students feel the use of technology for facilitating learning can improve the quality of teaching. Students were interviewed and told about how the use of technology can increase their level of engagement. There are students who claim that using technology can lead to increased motivation to learn; others stated that his experience in online classes was exciting and fun. The students love to see online the learning media made by lecturers; at an unspecified time, they feel that they have access to learning material for twenty-four hours a day, which is quite profitable.

4.6. Collaboration

Students interviewed gave comments on improving the collaboration use model, and how it functions in increasing their participation and involvement in the class. A student

commented on how supports and collaborations with other friends in class helped him to build confidence and increase his understanding of OOP content. He also mentioned the importance of working collaboratively to complete tasks related to direct learning activities and project-based assignments. Furthermore, as a result of the FGD, students get working-group assignments that are more effective than listening to the lectures, and note on face-to-face learning according to the lecture schedule; they agree on collaborative tasks that require them to take the active role in the learning process. Hybrid Teaching Model gives students the opportunity to work collaboratively and cooperatively to increase their involvement and performance.

4.7. Communication

The importance of communication among students and lecturers. The results of FGD show that students feel they can communicate more when online. Compared to traditional classes, students agree that there is more interaction between their classmates and lecturers when online. Students can discuss problems, share solutions, and express their thoughts. Students interviewed said that they had many opportunities to talk to lecturers every time an online class took place. Students see that improving communication is an essential contribution to their positive experience with a hybrid class.

4.8. Discussion

The results and findings of this research show that students engaged more in hybrid classes compared to traditional classes. The average value of Hybrid class tests

with Traditional class is not the same. The hypothesis is valid based on the results of the analysis in the Group Statistics table above, where the mean value of the Hybrid class is higher than the mean value of the Traditional class, etc.

Students openly acknowledge passive interactions during college and the limited communication among lecturers and the other peers before hybrid class is conducted. Thus, the hybrid class has positive impacts on students' engagement. The lecturers made unit test results indicating that there are different performance capabilities between traditional and hybrid classes. Students work collaboratively with the various groups when learn each other by discussing the problems, explaining the procedures, and confirming of answers — lecturers functions as a facilitator, and directing when it needed.

5. Conclusions

The results and findings show that students have more engagement in hybrid learning compared to traditional learning. Students in hybrid learning class experience quality teaching that is student-centered and student-focused. Hybrid learning class makes it possible to increase the use of time with varied teaching strategies, including direct activities and the structure of the collaboration learning. While research on the effectiveness of the hybrid learning is limited, this research study provides additional and valuable information about the impact of the learning model on students' engagement and performance. Although the hybrid learning is relatively new technology for learning, it certainly has the potential to be considered useful in terms of increasing students' engagement and performance in the classroom. From the results of the study, it was found that $\text{sig.}t = 0.03 < \alpha = 0.05$, and it was concluded that H_0 was rejected and resulted in acceptance H_a : $\mu_A > \mu_B$ means that the average student learning outcomes following hybrid learning were higher than students who followed learning activities with conventional methods. The student also recognized improvements in the quality of instruction and use of class with the hybrid learning strategy. In terms of academic performance, there was a significant change between the hybrid learning strategy and those who were taught in a traditional classroom environment.

Acknowledgements

This research work is supported by the Program Bantuan Seminar Luar Negeri Ditjen Penguatan Riset dan Pengembangan, Kemenristekdikti dan Universitas Nasional.

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PR Writing Learning Package Flipbook as an Instructional Media

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract Ideally, a public relations practitioner should master the techniques of writing and know the PR script forms because it is very helpful in daily Public relations activities. PR writing learning is learning that operates on the ability of writing mainly on PR with a goal after studying script writing techniques of public relation, the student can produce media kit in the form of PR script that can be used as tools in the exercise of his profession. This research aims to look at the use of PR writing learning package flipbook as an instructional media. This research used quantitative approach with data analysis using descriptive statistics. Learning outcomes of the students using PR Writing learning package flipbook as an instructional media increases as much as 94% compared to students who did not use the flipbook PR writing as much as 54%. The existence of optimal learning outcomes, then it can be said that the use of PR writing learning package Flipbook as an Instructional media can make the students get effective and efficient learning resource more easily.

Keywords PR Writing, Learning Package, Flipbook

1. Introduction

Public relations can be understood as a function of management that manages communication arrangements to bridge the interests of organizations with public interests in order to achieve the goal of mutual understanding, increase understanding, build interest, and foster public sympathy. For this reason, a public relations practitioner needs good communication skills both orally and in writing. One of the homework assignments is to make a PR text published in the media. In order to produce a good text, a public relations practitioner must have writing skills like a journalist, for the understanding of text such as news values, journalistic language, and journalistic code of ethics needs to be mastered by a public relations practitioner. If noted,

Public relations is now used as a structural management tool that is an integral part of an organization/company so that it has a very significant role and its contribution also determines the success of the organization/company to achieve the vision, mission and common goals. PR has a role in helping organizations, which determines not only what will be said, but also what will be done. (Ardhoyo, 2013)

Some people who have known the tradition of writing and reading make both of them very important activities. This is not because the information received by someone is sometimes not only delivered orally but also in writing. With the writing, the information delivered can last longer and be saved because he can read it again anytime. In communication itself, writing has four elements, namely: 1) writing is the delivery of self-expression; 2) writing is a general idea that can be conveyed to the reader; 3) writing is a rule and behavior; 4) writing is a way to learn. Thus, writing is a form of expressing oneself that has the purpose of communicating or conveying ideas which cross the boundaries of space and time (Rahman, 2017).

The technique of writing public relations itself is a typical writing skill of PR/PR in producing texts needed to build a positive image and popularity of a company or organization. There are two types of script writing in public relations, namely: (1) in the form of Media Relations/Press Relations or media kits, such as background scripts, press releases, advertorials, and press conferences (press kits); (2) in the form of promotional, information and communication media regarding a company or organization, such as a text to be published in the form of newsletters, in house magazines/company magazines, annual reports, company profiles, leaflets, booklets, brochures and so on.

Looking at the criteria that must be possessed by a public relations practitioner in the form of the ability to write a PR (PR Writing) script and build good communication with the media (media relations), then someone who studies, engages and explores the world of public relations has the

ability. Gandariani (2016) states that "The role of PR writing and editing, namely the ability to write, create and design PR media is needed. This is done to create public understanding, build a corporate image, build favorable public opinion and establish goodwill, cooperation, and various things related to the company's situation" (Gandariani, 2016).

The PR Writing (PNK) 1 is one of the pre-eminent courses for students of the public relations major, AKOM BSI Jakarta in its study introducing and providing knowledge about expertise that must be owned by Public relations in this case writing skills (writing skills).

The goal after studying public relations script writing techniques is that students can produce media kits in the form of public relations texts that can be used as tools in carrying out their profession. In the PR Writing (PNK) 1 was oriented to the assignment in the form of a public relations scriptwriting work by the lecturer. A number of materials that must be mastered by students are public relations media kit, in the form of backgrounders, press releases, advertorials and brochures with a percentage of 65% of the overall course value, while 20% for supporting activities in the form of workshops (PR seminars), and 15% for activeness in the learning process in class.

To carry out learning based on the objectives and content of learning above, it is necessary to have a variety of learning resources such as teaching materials in this case; the teaching book in the form of a public relations script writing learning package 1 contains an introduction (brief description, relevance, objectives, and learning instructions), discussion titles, exercises, summaries and formative tests and glossaries, so students can understand and do assignments well.

In addition to textbooks for students, a lecturer guidebook is also needed which contains descriptions of instructions and guidelines for activities that must be carried out by the lecturer in the learning process to the assessment criteria using the learning package provided. The availability of this lecturer guidebook is expected to be able to assist lecturers in understanding and delivering material and providing guidance on the preparation of public relations texts in the form of media kits.

However, what happened to students of the public relations major AKOM BSI Jakarta is that they experienced difficulties in the learning process of public relations script writing. This is because the learning resources used are only in the form of power points that have been made by the consortium team so that students feel they do not have a picture of what public relations texts should be and direct experience that can be used as guidelines in making public relations texts. Whereas it

should be, "the resources needed to support learning must include material resources, human resources such as teachers and support staff and physical facilities such as laboratories, libraries, and adequate classrooms" (Okongo, Ngao, Rop, & Nyongesa, 2015).

With the limited learning resources obtained during learning, it is, therefore, necessary to develop a variety of learning resources. In this case, learning resources can be in the form of learning materials for public relations script writing 1, as well as guidebooks for writing public relations texts for lecturers who are supporting in the learning process.

It is expected that the development of public relations script writing learning package 1 can help students understand the learning and practice material directly to make public relations texts in the form of media kits in accordance with public relations script writing standards both independently (train them repeatedly at home) or be guided by lecturers in the class. For lecturers who teach PNK 1 courses, they are expected to provide guidance directly related to public relations texts in accordance with the provisions and demands that need to be achieved by a public relations practitioner in a professional manner. In an effort to solve the learning problems described above, a solution is needed in the form of developing a public relations script writing learning package 1, which is a teaching book for students and a textbook guide for lecturers.

2. Literature Review

2.1. Learning Package

Educational technology is a complex process but integrated with humans, procedures, ideas and equipment and organizations to analyze a problem that concerns all aspects of learning, then designing, implementing, assessing and managing the solving of learning problems and then finding solutions that are appropriate to those problems. Thus, in essence, education technology is a scientific discipline that has an interest in solving learning problems based on a series of systemic and systematic principles using various approaches (Kristanto, 2016). Educational Technology: A Definition with Commentary in Januszewski & Molenda's book proposes the definition of "educational technology in principle is a study and ethical practice in facilitating learning and improving performance by making, using and managing appropriate processes and technological resources" (Januszewski & Michael Molenda, 2008) as can be described:

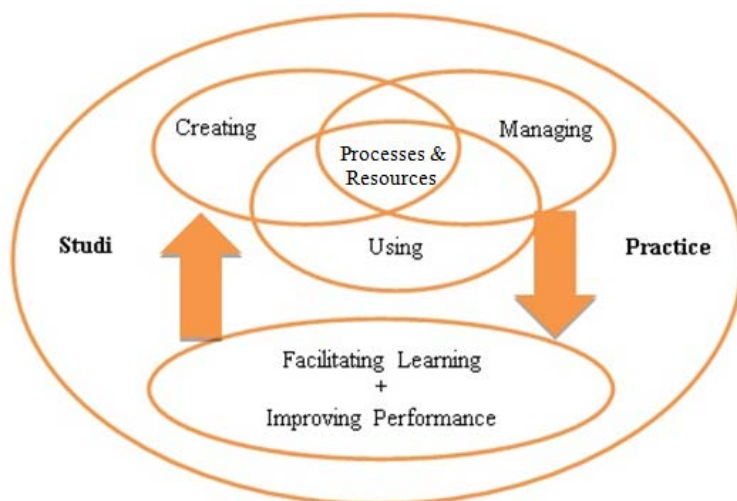


Figure 1. A Visual summary of key elements of the current definition

By looking at the definition of educational technology above, learning activities should be a process that is deliberately designed to meet learning needs. In order for learning needs to run according to the learning objectives, efforts to provide and utilize learning resources by implementing learning development need to be done. In the field of own educational technology, "there is the development of appropriate teaching materials according to needs. In relation to the development of teaching materials, the objectives to be achieved by educational technology are in accordance with the component "creating" in the educational technology definition above, namely facilitating learning" (Lukman & Ishartiwi, 2014). Based on the explanation presented by the Association for Education and Communication Technology (AECT), learning resources are all things that support the learning process including service systems, learning materials, and the environment. Judging from its utilization, AECT distinguishes learning resources into two types, namely: (1) learning resources that are deliberately designed (by design) to be used in learning activities to achieve certain learning goals. Learning resources that are designed can be in the form of text, textbooks, slides, films, videos, etc. which are deliberately designed to help achieve certain learning goals. (2) learning resources that are utilized (by utilization) to help achieve certain learning goals, for example, community leaders, shops, markets, and museums (Darmono, 2006). The use and selection of appropriate learning resources greatly influences the learning process, because "learning resources are supporting aspects of the success of the learning process. Learning resources in this term are understood as tools, materials, tools, arrangements, and people who interact with students to facilitate learning and improve performance" (Januszewski & Michael Molenda, 2008).

In the learning process, learning resources as one component or element of learning (learning) play an

important role in the framework of the implementation of interesting and meaningful learning activities for students. This is because the existence of learning resources allows the growth of the learning culture of students independently as a basis for habituation in later life, as well as creating communication between students and adults and peers. The source of learning itself has two sides, where one side of the learning source has a static nature, but on the other hand, it is required to have a dynamic role. Static properties are derived from the components of learning resources in the form of objects including humans, books, libraries, mass media, natural environment, and educational media. The other side of learning resources is dynamic where learning resources are required to act as a source of various information and knowledge needed to develop the desired competencies in the field of study or the subjects they study. Looking at these conditions, learning resources have important values to be developed and renewable (Jailani & Hamid, 2016). Learning packages or learning devices are a number of teaching materials, media, tools, textbooks, learning guidelines and instructions that will be used in the learning process. The package or learning device itself consists of; 1) syllabus; 2) RPP; 3) Hand out; 4) teaching materials (textbooks); 5) learning guidelines; 6) media; 7) assessment tools; 8) sheets of student learning activities (Tawalla, 2014). The development of the learning package itself is one of the practices of the application of the field of educational technology, if reviewing development is a process of finding a basic idea in the form of a product prototype as a result of the design of learning devices based on needs. Development of learning packages or commonly known modules themselves is a program package that is arranged in the form of certain units which are then designed in such a way as to the learning needs of students. The module is also an independent learning package which includes a series of learning experiences that are deliberately planned

and designed systematically also help students achieve learning goals. The main purpose of the use of teaching books or modules themselves is to improve the efficiency and effectiveness of learning in good schools in time, funds, facilities and staff to optimize.

For this reason, in developing the learning package, there are 5 elements that need to be considered, including 1) Syntax, which is in the form of steps to implement learning; 2) Social systems, namely the atmosphere and norms that are applied in learning; 3) The principle of reaction, which is in the form of a description of how the teacher should look at, treat, and respond to students; 4) Support systems, in this case, are all facilities, materials, tools or learning environments that support learning; 5) Instructional and nurturant effects, namely direct learning outcomes based on specific instructional goals and general instructional learning outcomes (Padlurrahman dan Murcahyanto, 2014). Therefore, a good learning package is a learning package that is developed by taking into account the characteristics of students as learners, and based on the characteristics of the field of study; therefore, to realize it we need appropriate strategies and designs considering learning packages that have a very important function in learning activities (Suryaningsih, 2014). For this reason, learning should run optimally if it is well designed and planned, where learning planning is inseparable from learning devices whose substance must be developed by educators and become a guide for educators in carrying out learning so as to create pleasant and conducive learning conditions and situations in accordance with learning objectives of the learning (Wijayanti & Marsigit, 2015). The development of learning packages in this study is in the form of developing textbooks that cover student teaching books, lecturer guides, and student guides made in print and paperless. Specifically, the products produced in the development of this learning package:

- 1) Public Relations Script Writing textbook 1, which contains an introduction (a brief description of the subject, relevance, instructional objectives, learning instructions), learning activities 1 to 6 that are equipped with an introduction, learning objectives, material descriptions, exercises, summaries, formative tests, glossary, and references. In this textbook, it is also equipped with guidelines for making media kit Backgrounders, press releases, advertorials, and brochures. In this guide, it contains the format of the creation, contents, technical make, examples until the guide makes a brochure, (brochure design using Photoshop);
- 2) Lecturer Handbook for Writing Public Relations Script 1, which contains Course description, rationality, relevance, learning instructions, instructional analysis, elaborating learning content frameworks, learning frameworks, learning approaches and procedures, learning strategies,

practice and assignment reference criteria, assessment criteria, assessment rubrics, message planning sheets, hand out teaching materials and closing;

- 3) Student Guidebook for Writing Public Relations Texts 1 containing; Course description, relevance, learning instructions, learning syllabus, learning approaches and procedures, methods of using learning packages, learning assignments and evaluations, practice & assignment reference criteria, assessment rubrics, message planning sheets, hand out teaching materials, examples of media kit products and cover. As for the output, this public relations script writing package 1 is in the form of a printed and paperless book so that it makes it easier for students to learn this PR writing 1 learning.

2.2. Instructional Media

The word media comes from the Latin "medium" which literally means middle or introduction (Arsyad, 2004). The term learning itself is used to show that educational efforts are carried out intentionally, with goals set before the process is carried out and whose implementation is under control. Thus, learning media is everything that is used to channel messages and can stimulate thoughts, feelings, attention and will, and the learning so that can encourage the occurrence of a deliberate, purposeful and controlled learning process (Miarso, 2009). The benefits of using media in the learning process are: (1) the learning process can occur in two directions so that it becomes more interactive; (2) the learning process becomes more efficient; (3) the learning process becomes more interesting, and it is hoped that with the learning media the learning quality of students will be increased; (4) the place where the learning process takes place can occur anywhere and anytime; (5) in this case, the role of the educator functions as a facilitator (Widodo & Jasmadi STP, 2008). Azhar Arsyad stated that there are several criteria that must be considered in media selection including (1) in accordance with the objectives to be achieved; (2) right to support the contents of learning that are facts, concepts, principles, and generalizations; (3) practical, flexible and enduring; (4) skilled teachers use it; (5) target grouping; (6) technical quality (Arsyad, 2004). Criteria in the selection of learning media also need to pay attention to topics, teaching materials, content that is relevant to the curriculum, real concepts, order of sequences, effects, and colors that have been tested for truth. Thus the existence of learning media will stimulate students to remember both the knowledge that he has and new knowledge. In addition, with learning media students become more active by conducting interactions and feedback on both the teacher and other students. Thus, the more learning goals that are helped to use media, the better the media will.

2.3. Flipbook

Flipbook or Flipping Book is a flipping book, and the term Flipbook is taken from a children's toy that contains a series of different images, but if opened one by one from the page it will appear as if the image is moving. Generally, Flipbooks are widely used in children's books, but currently also widely used in textbooks for adults. In the use of teaching books, flipbook can be (e-book), where the use of e-books by the world community has been popular in the past few years, but many feel dissatisfied with ordinary digital books because general e-books can only rely on the monotonous way to switch from a page to the next page. On the other hand, the reader only has the experience of reading ordinary books; therefore, a better visual experience is needed. The display design of digital books that many people are interested in is digital books with three-dimensional e-book technology known as a flipbook, where pages can be opened like reading a book on a monitor screen (Riyanto, Lukman, & Subagyo, 2012).

Flipbooks began to be developed for learning at school. A study conducted by (Ramdania, Sutarno, & Waslaluiddin, 2007) provides results that using flipbook media in learning can improve students' learning outcomes. This is caused by the influence of students' interest in the appearance that is more interesting and interactive than printed books. The presence of the latest technology provides a great opportunity for the use of digital books in science and distance learning (Gorghiu, 2011). According to (Shideqy & Lestari, 2010) things needed in the development of digital books as learning resources, namely learner (learner), facilities and media learning, facilitators (teachers), and the availability of evaluations (tests). The same is true for the use of a flipbook for learning in higher education or for students who find learning more interesting, efficient and effective because students can read it anywhere and anytime; moreover, the e-book in the form of a flipbook can be downloaded on a cellphone or computer.

3 Methodology

The research design used is research and development or what is known as research and development (R & D) by adopting the Borg and Gall development model, namely "research methods used to produce a particular product and test the effectiveness of a product" (Sugiyono, 2012). The product produced in this study is a PR writing learning package 1 which consists of textbooks equipped with guidelines for making media kits, lecturer guides and student guides. The initial step taken by the researcher is to make an initial product (prototype) which will then be evaluated/tested by an expert (expert) to obtain input. After revising the initial product, it will then be tested by individuals, small groups and main groups. To see the effectiveness of the learning package developed,

effectiveness tests were also conducted. The effectiveness test on this learning package is done by a simple experiment that the learning outcomes process in the class using the learning package and in the class that does not use the learning package are compared. After finding the results, it was analyzed using descriptive statistical analysis. The output of the first public relations script writing learning package is in the form of printed and paperless books, and the learning package can be in the form of hard copy and soft copy so that it makes it easier for students to learn this PR Writing.

This development was carried out with researchers designing the formula for developing Dick and Carey's instructional designs combined with product development models from Borg and Gall, which had also been modified by researchers so that the detailed development model by researchers began in stage 1) needs analysis in which preliminary studies were carried out; 2) determine the initial characteristics of students; 3) conduct instructional analysis; 4) writing specific instructional objectives; 5) develop tests made in the form of benchmark reference tests and norm reference tests; 6) developing instructional strategies; 7) developing instructional materials; 8) develop and choose learning media; 9) make product draft designs; 10) developing products; 11) design and conduct formative evaluations; informative evaluations carried out on 4 experts, namely material experts (PNK I lecturers), instructional design experts, linguists, and media experts. For the development and selection of learning, media researchers use media experts namely mass media experts and public relations script experts. After the researchers tested the instructional materials for the three experts, and the development and selection of instructional media on two media experts, the researcher revised the product to be tested again in stages one by one, small groups and main field groups; 12) at this stage, the researcher has obtained a final product for lecturer guidance after an expert evaluation is carried out, but for teaching materials and student guidance products, it is carried out up to the large group stage and becomes the final product. This is done considering that the lecturer guide has an assessment rubric in the form of assessment criteria carried out by the lecturer on the assignments done by students. The development of this public relations script writing 1 learning package is not only made in the printed form but also made in the form of a flipbook or ebook made in digital form so that students and lecturers can learn the PNK 1 learning package by using gadgets anywhere and anytime.

The instruments used in the collection of data in the form of the instrument now are assessment scale values. As for the instruments, used indicators refers to an instrument development instructional design according to Suparman Atwi consisting of needs analysis, instructional analysis, instructional Objectives, formative evaluation instruments, strategies learning, the creation of learning materials (Suparman, 2012). Data collection techniques used in

obtaining data regarding the implementation and the effectiveness of the model is done by means of: 1) Guidelines for observation; 2) Interview guidelines; and 3) question form. The analysis of the data used is descriptive qualitative i.e. analyzing data in the way of describing or depicting the various characteristics of the data that has been accumulated with as-is without any mean to give a conclusion in general or generalization (Sugiyono, 2012). Calculating an average score of data used in each component using the following formula Total average score indicator divided by the number of problem, then find the average score of the aspects/components (Suharsimi, 2002).

4. Results and Findings

The results of the development of this model are in the form of a PR Writing Package 1 consisting of 1) Textbooks equipped with guidelines for making media kits; 2) Lecturer Guide; 3) Student Guides that are intended for students of the AKOM BSI Public Relations major. In this development process, the researcher refers to the process of developing the Dick and Carey learning model which is combined with the development steps of Suparman in the MPI model which the researchers themselves modified. While for the development of learning packages researchers used the Borg and Gall model. The selection of the Dick and Carey development model which is a learning development model with a system approach is considered the simplest so that it is considered efficient compared to other development models. Dick and Carey's learning development model has also been widely used by many researchers as a research and development model. The development steps of the Dick and Carey model have several stages including 1) identification of instructional needs and writing general instructional goals; 2) conducting instructional analysis; 3) identifying the behavior and initial characteristics of students; 4) formulating specific instructional objectives; 5) developing research instruments; 6) developing instructional strategies; 7) developing materials and choose learning materials; 8) designing and implementing formative evaluations; 9) designing and carrying out summative evaluations.

In adopting the Dick and Carey instructional development model and the MPI Model (Suparman, 2012) which was later modified by the developer, the stages of development were found including 1) needs analysis (need assessment); 2) analysis of the characteristics of students; doing instructional analysis; 3) writing general instructional objectives; 4) conducting instructional analysis; 5) formulating specific instructional objectives; 6) developing research instruments (making test kits in the form of benchmark reference tests and norm reference tests; 7) developing instructional strategies; 8) developing materials and choosing learning materials; 9) developing

and choosing learning media; 10) designing and implementing formative evaluations; 11) designing and carrying out summative evaluations. In developing this model, the developer gives limits to the formative evaluation stage. After the final product has been tested it is then used in odd semester learning to see the effectiveness of this development product. In the 11th stage (summative evaluation), the developer did not, which is because in the Dick and Carey model this stage can only be done by people outside the developer, and it is not done by the developers themselves as well as the limitations of developers in disseminating products. Broadly speaking, in the stages of developing, the Public Relations Script Writing 1 learning package is carried out in 3 stages including:

First, the stage of identifying needs. In this process the developer identifies the needs according to the problems that occur to then find solutions to their problems. After finding the results of the needs analysis based on the existing problems, then the developer further identifies the instructional needs and writing general instructional goals (TIU), makes instructional analysis and identifies the behavior and initial characteristics of students. Second, the stage of development. After identification of needs, then further development is done by writing specific instructional objectives (ICT), compiling learning outcomes assessment tools (making benchmark/normative reference tests), developing instructional strategies to develop instructional materials. Third, the formative and revised evaluation stages. This stage is carried out by theoretical and empirical feasibility tests. In the theoretical feasibility test, an assessment is based on the assessment of material experts, instructional design experts, linguists, and media experts. Whereas the empirical feasibility test was found by conducting one-to-one person, small group and field test.

In producing instructional materials, the developer first collects various references including books, online media (internet), e-books, articles to a discussion to learning experts and public relations script writing material for the preparation of instructional materials. This reference collection activity is collected in primary and secondary data. In the preparation of this instructional material, the developer always gives detailed attention to the description of the learning material adapted to the predetermined subject and sub-topics according to the context relevant to the current development. This is none other than that this instructional material will later be used in students' learning activities and guidance for lecturers, so that it is necessary to pay more attention to the right design for students because it is a learning resource that can be used anywhere and anytime either with or without assistance from lecturers. The learning package that is developed is very much considered, where instructional materials need to be designed as completely as possible so that students can use them appropriately and easily understood the

materials, understand the objectives to be achieved in learning, get examples of public relations scripts that are in accordance with the standards of writing public relations. Measuring learning outcomes is conducted through formative tests given at each meeting.

Thus, this PR Writing learning package is complemented by various complementary components of learning as described below:

1) Introduction, namely the description of the learning of public relations script writing I which consists of a) Short description; b) Relevance; c) The learning objectives presented are in the form of general instructional objectives and specific instructional objectives; d) Learning instructions;

2) Learning activities that contain learning activities in one to two meetings. Learning activities are arranged based on pre-determined topics so that there are 6 (six) learning activities. The scope of this learning activity is 1) Introduction; 2) Learning objectives; 3) Description of the material which contains the description of the subject and subject matter; 4) Exercise; 5) Summary; 6) Formative tests; 7) Glossary; 8) References

3) Guide to creating media kits; in this case it contains guidance on making a media kit backgrounder, press releases, advertorials and brochures in more detail such as steps for making scripts, writing formats, writing techniques, examples of public relations texts to guide making media in the form of brochures using adobe photoshop (graphics media creation software). The guide to making this media kit is also used as a medium of learning in the process of making a script where there are various examples of making up to the results of the media kit that has been produced in accordance with the standards of public relations writing. At the end of each discussion it is equipped with exercises intended as mastery feedback on technical instructions that have been described through the provision of scriptwriting assignments, as well as a column of notes containing student notes related to matters that are considered important and need to be given emphasis;

4) Closing; it contains the final conclusions on the discussion of textbooks that have been described and the expectations of the author towards the user or the reader can have an understanding and practice directly making public relations manuscripts and in accordance with the achievement of the final goal of learning PR writing I.

Lecturer Guidebook for PR Writing 1, which contains

Course description, rationality, relevance, learning instructions, instructional analysis, outline learning content framework, learning framework, learning approaches and procedures, learning strategies, practice and assignment reference criteria, assessment criteria, assessment rubrics, message planning sheets, hand out teaching materials and closing.

Student Guidebook for PR Writing 1 contains Course description, relevance, learning instructions, learning syllabus, learning approaches and procedures, methods of using learning packages, learning assignments and evaluations, practice & assignment reference criteria, assessment rubrics, message planning sheets, hand out teaching materials, examples of the media kit.

This textbook is made in the learning package PR Writing I form of eBooks by using PDF Flip Professional or PDF Builder software with which he turned textbook in the form of flip book, and then facilitated students in reading the textbook, since it can be read via a computer or mobile phone. In addition, the textbook in the form of flip book also makes the learning materials more interactive, engaging and efficient.

In the process of development, researchers also refer to the process steps of the learning model development Dick and Carey that are combined by step development Atwi Suparman in the model of MPI researcher who later modified, while for the learning materials development researchers use model Borg and Gall itself. The selection of the model of development of the Dick and Carey model which is the development of learning with the simplest approach system assessed so judged efficient compared to other development models. A learning model of development Dick and Carey has also been used by many researchers as a model of research and development. Script writing PR materials very cared about instructional materials; it needs to be designed as complete as possible so that students can use them appropriately and easily understand the materials, to understand the objectives that will be achieved in the learning, get the script writing examples of public relations that correspond to the standards of the PR Writing, to be able to measure results close to learning through formative tests that are given on each of his encounters. Following is the display of the PR Writing I, Textbook, Lecturer Guidebook, and Student Guidebook Flipbook as an Instructional Media as the end product of this development:

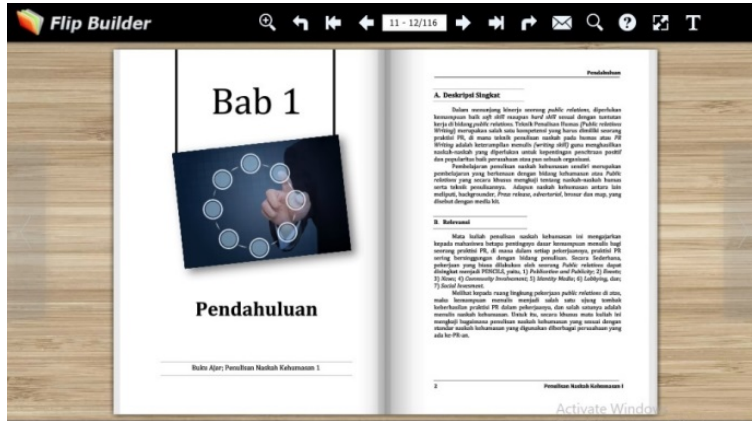


Figure 2. Display product PR Writing Learning Package Textbooks Flipbook.

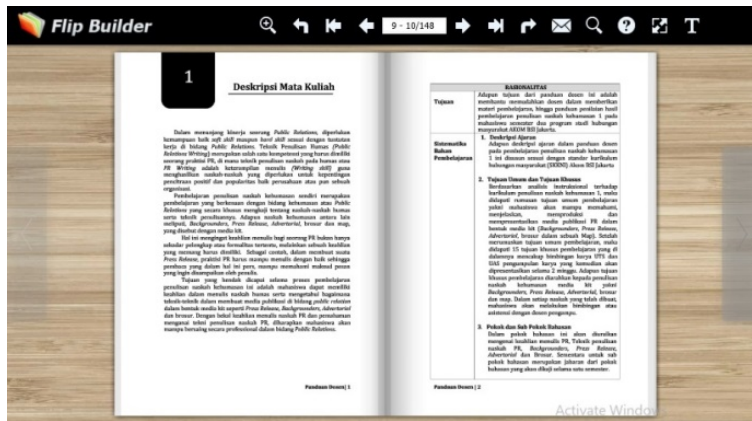


Figure 3. Display product PR Writing Learning Package Lecturer Guidebook Flipbook.

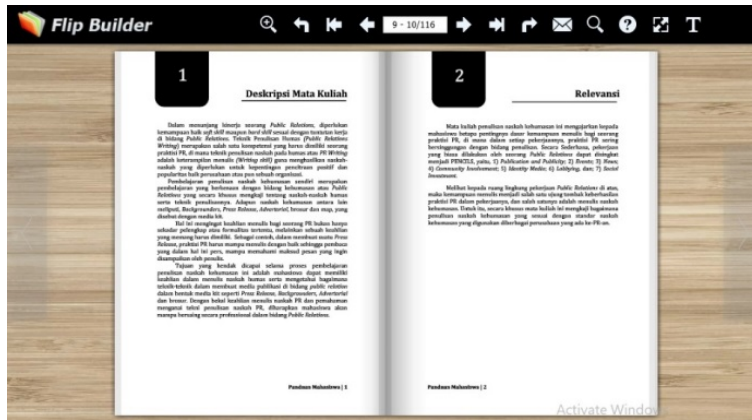


Figure 4. Display product PR Writing Learning Package Student Guidebook Flipbook.

If you look at the PNK I learning package above, where the learning package that has been developed is made in the form of a flipbook as a learning medium for students. With this flipbook, students can study independently anywhere and anytime and learning becomes more innovative and interesting.

Based on the results of the assessment, the empirical testing has been done on the instructional design experts, material, linguist and expert on media then advice and input as materials improvement on product learning

materials shaped a flip book. After the repair is done and then tested again on a one to one person, small group and filed their respective test advice and input as materials improvement product, for that matter, overall assessment of the empirical study shows that learning package that developed products are qualified both the empirical and theory to be implemented or used in the actual field, i.e. in class in script writing learning PR.

In an attempt to find out the effectiveness of improved models i.e. in the form of improved quality of learning

outcomes learning students, then the developers tested the effectiveness of the learning package PNK in 2 different classes. On class A as many as 25 students were given the learning package PNK, while in contrast, developers are testing the effectiveness of class B products totaling 25 students (according to the number of students in the class) as a group who do not given the learning package. It is intended to see how much the effectiveness of the learning package PNK developed in the improved quality of learning outcomes. The effectiveness of this test is given at 4 times the meeting in accordance with the number of meetings on a charged material works (making the product media kit), and the effectiveness is evaluated using a rubric assessment used by each lecturer class. The self-assessment rubric is used because subjects are works

in which media kits created by students are then presented. As for the results of the rubric assessment on the effectiveness of the learning, package PNK can be looked at a picture of the chart below:

The assessment Figure 5 is retrieved by using the rubric assessment of the quality of student learning outcomes, and then it can be explained that the degree of success of learning on grade i.e. that use materials PR Writing in flipbook higher i.e. as much as 94% while class B that do not use PR Writing materials in the flipbook is as much as 54%. There is a difference between 40% against the learning outcomes obtained by students. Thus, this indicates that the quality of the PR Writing materials developed have a high effectiveness compared to classes that do not use.

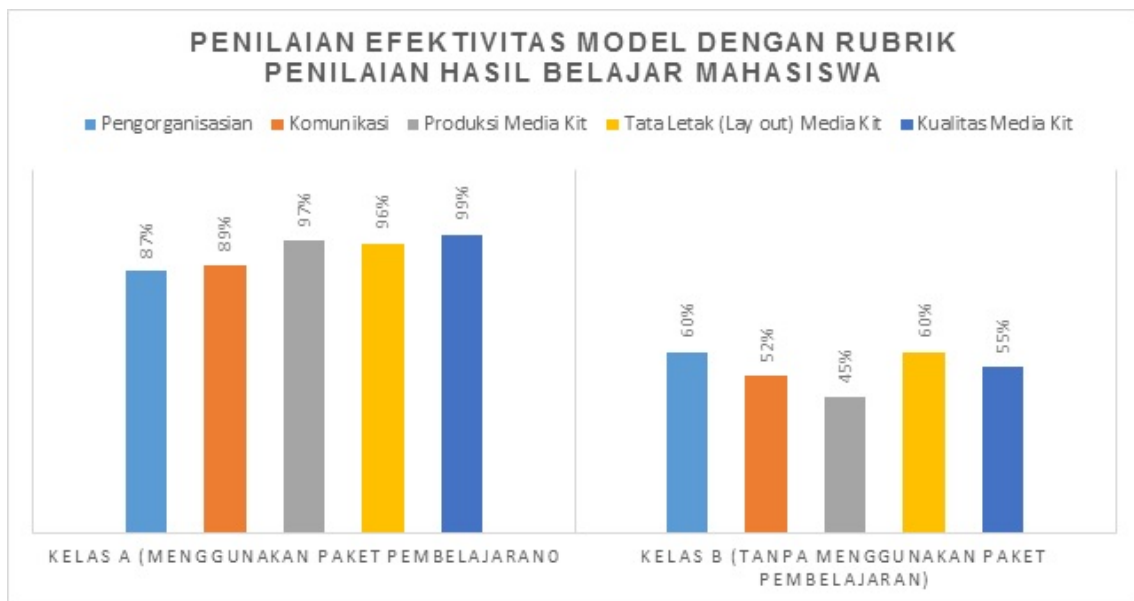


Figure 5. The Effectiveness of the Model with the Student Learning Outcomes Assessment Rubric

If described in the form of an assessment table for the effectiveness of learning packages assessed by using the assessment rubric based on student learning outcomes, it can be seen in the table below:

Table 1. Assessment of Model Effectiveness on Student Learning Outcomes

No	Assessment Criteria	Assessment	
		Class A	Class B
1	Organizing	87%	60%
2	Communication	89%	52%
3	Media Kit Production	97%	45%
4	Media Kit Lay out	96%	60%
5	Media Kit Quality	99%	55%
Total		94%	54%

The **Table 1** above shows that the assessment of the effectiveness of the public relations script writing learning package model was obtained from two different classes (classes given packages and classes not given packages) and that the quality of students' learning outcomes was higher for students using learning packages. These learning outcomes are obtained using the assessment rubric (performance assessment).

5. Conclusions

This research and development produced a product in the form of a PR Writing learning package in the form of a textbook flipbook equipped with guidelines for creating media kits, lecturer guides, and student guides. The product of the first public relations script writing learning package was deemed feasible both theoretically and empirically. It was theoretically feasible because this product was produced through a long process and the assessment was carried out in stages and repeated. Theoretical tests are conducted on instructional design experts, material experts, linguists, and media experts. This theoretical test is intended to obtain input on the product being developed and henceforth this product is considered feasible to use by the user, while the empirical test is carried out by conducting a series of trials on one to one person, small group and field tests. This trial was conducted to see improvements to the product, and then this product was considered feasible to use. Empirical feasibility is also shown by the effectiveness of increasing learning outcomes in the public relations script writing course; after using the PNK I learning package, the level of success of learning in class A of those who use the higher PNK I learning package which is 94% while class B that does not use the learning package is as much as 54%, and there is a difference of 40% towards learning outcomes obtained by students. Thus this shows that the quality of the public relations script writing learning package has high effectiveness compared to classes that

do not use the learning package. The use of flipbook as a learning media in this public relations script writing course is a source of independent learning that can be used anywhere and anytime where learning material can be opened on a computer or handphone.

Acknowledgements

In the process of this research, researchers would like to thank their parents, husband, the beloved, promoter and co-promotor, friends, students also the research placed at AKOM BSI Jakarta. With the support whether material and non-material that had been sent a researcher of the completion of this research. Finally researchers hope that this research can give benefits to science development and readers, as well as the researchers.

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The Problem-Based Learning Procedural Model in the Software Modeling Course at the Information Technology College in Indonesia

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract The characteristic of the Direct-Instruction system, which depends on the ability of the teacher's reflection, only provides little opportunity for students to be actively involved in the learning process. This process contrasts with the characteristics of the Software Modeling course which ideally emphasizes student-centered learning. The impact of the learning process becomes ineffective, and students cannot reach the minimum competency standards planned in the learning design. We propose a model of integrating Problem-Based Learning (PBL) into the Learning Modeling Software design on three elements of the learning system namely Elementary Curriculum, emphasizing the use of problems as the starting point of student learning; Element Group, emphasizing collaboration systems (group discussion based learning); and Student Elements, emphasizing the Student-Directed-Learning (SDL) system. We tested the effectiveness of the PBL model in small group trials in learning situations that resembled the actual situation and found PBL effectively increased student mastery of a particular topic. However, further discussions regarding 1) how many guidelines are needed in PBL; 2) potential student experience confusion if there is not enough initial learning framework; 3) students who do not have adequate initial knowledge and tend to experience underdevelopment, are still needed to find PBL models that are genuinely effective in learning the field of Software Engineering.

Keywords Procedural Model, Problem-Based Learning, Software Modeling

considerable attention at the College of Computer Science. Software engineering is a discipline related to the application of theory, knowledge, and practice to effectively and efficiently build reliable software systems that meet the requirements of customers and users. IEEE and ACM put Software Engineering into one of the main fields of study in their curriculum (IEEE Computer Society, 2013), and the curriculum has become a reference for many universities throughout the world in compiling computer science curricula.

Software Engineering has several characteristics that must be harmonized with teaching methods. Software Engineering is a field of science whose technology continues to change due to several factors. First, the software requires compatibility with other hardware and software. Progress in hardware technology, additional software, changes in the company's business strategy, and changes in end-user behavior demand alignment of software requirements. This condition requires high adaptation skills in the software development process (Juman, 2018). Second, the large volume of code (program) and the complexity of the software system architecture led to small software development systems leaving individually and turning to technology development collectively and collaboratively. Third, software design and software programming technology also develop dynamically. Various development models and software programming languages encourage the emergence of new references in the software development environment, thus demanding adaptation to lifelong learning (Bollin, Hochmüller & Mittermeir, 2011; Kazimov, 2017).

Software Engineering applies a systematic approach to development, operation, and maintenance. Thus, software developers do need not only technical skills but also social skills in their work. Traditional teaching methods that focus on lectures and tutorials for Software Engineering

1. Introduction

Software Engineering Education (SE) has received

students are not enough to develop real-world problem-solving skills. In traditional learning approaches, most students must complete their assignments, and this is contrary to professional practice in a collaborative software development team (Krusche, 2017; Oliveira, 2013). Goel (2011) and Fertalj (2013) suggest that the importance of providing students with real problems and a real teamwork environment must be a concern in software learning.

According to Garg and Varma (2015), software engineering requires an effective and sustainable learning environment, an authentic learning climate, independent learning, learning from failure and success, and motivation of students.

The characteristics of the software require a learning approach that emphasizes active learning (Freeman et al., 2014; Jensen, Kummer, & Godoy, 2015), the concept of lifelong learning, problem-solving in the real world, unstructured problems, and skills collaboration (Karabulut-Ilgu, Jaramillo Cherez, & Jahren, 2018). These conditions are contrary to the learning system that is widely used in learning Software Engineering in Higher Education, namely the direct learning model (direct instruction).

Problem-Based Learning (PBL) is a constructivist-based learning model, namely learning initiated by the problems posed, questions, and problems that students want to solve. The use of complex real-world issues aims to motivate students to identify and examine the concepts and principles they need to know from work through this problem. Students work independently and in small work teams. They bring together collective skills in acquiring, communicating, and integrating information (Duch, Groh, & Allen, 2001).

The PBL is a learning strategy that encourages students to know how to learn and work together in groups to find solutions to problems in real situations. PBL makes students think critically and analytically to get and use scientific literacy appropriately (Ardianto, 2016). PBL correlates with cognitive functions that contain various types of creative thoughts and actions in the learning phase (Nuswowati, Susilarningsih, Ramlawati, & Kadarwati, 2017), including the use of existing knowledge, reorganizing new experience in cognitive structure, analysis and synthesis, structuring and developing ideas, and solving problems (Pierrakos, Zilberberg, & Anderson, 2010).

The application of problem-based learning through web 2.0 technology can simplify the movement of students individually to find learning resources, improve skills in collaborating in solving problems through flexible communication facilities, and access to shared resources (bookmarks, websites, articles, materials, etc.). PBL-based Web 2.0 also supports collaboration between students and teachers and offers connections to various external resources (Glud, Buus, Ryberg, Georgsen, & Davidsen, 2010; Tambouris et al., 2012).

This paper proposes a conceptual model of PBL

implemented in the two phases of the life cycle of Software Engineering which Pressman (2002) calls "the System Modeling phase."

2. Literature Review

There are many studies on software modeling learning methods. Tanner & Scott (2015) introduced the flipped classroom approach used in teaching system analysis and design using the Unified Modeling Language (UML) at the University of South Africa. The aim is to create a learning environment that is more student-centered to encourage class discussion and debate, which in turn serves to train students' critical thinking skills. Students not only have theoretical understandings of UML and design concepts but can also apply these concepts at the beginning of their learning. This finding concludes that the flipped classroom approach can improve students' understanding and ability to apply theoretical concepts and focus on solving real-world problems that are integrated into case studies.

The flipped classroom approach creates a learning environment that is more student-centered (Wibawa, Kardipah, 2018), increases student involvement, and encourages students' critical thinking (Moravec, Williams, Aguilar-Roca & O'Dowd, 2010). The flipped classroom approach also allows students to learn about theoretical concepts outside classroom settings and apply these concepts in the classroom while getting help from facilitators and other students (Water-Perez, Dong, 2012). However, the flipped classroom approach is oriented towards class meetings and is fully controlled by the teacher, so students are not free to apply their knowledge to solve more complex problems than those specified in training. Naturally, the concept of modeling should be carried out in various ways and often focuses on modeling options and assessing their validity. This situation seems to confuse some students who then break away from discussion because they feel they are not free to be creative.

Paez (2017) researched the "Universidad Nacional de Tres de Febrero," Argentina, using a flipped classroom approach and combined it with other non-traditional teaching techniques in software learning. The teacher designs relevant teaching materials and plans activities in the classroom and outside the school with the help of virtual classes. Virtual classes are used to share files and to expand interactions between teachers and students outside class meetings. Additional teaching strategies involved in this approach are a sustainable practice, teaching by example, and the use of real-world concepts. The primary pedagogy used in this study is a flipped classroom. This approach proved useful in learning Software Engineering. However, this approach does not emphasize developing teamwork skills.

Fonseca and Gomez (2017) apply problem-based learning (PBL) to software engineering courses at two different universities in Chile. The PBL application allows

students to gain more in-depth knowledge and use it in practical ways to follow work plans. Within this framework, students are given different project roles in real projects and can work in dynamic environments using PBL. Although this learning framework provides importance of developing independent learning skills (development of creativity and teamwork), this method is bad at developing communication skills.

Fakhriah (2014) introduced the PBL model as an effort to develop critical thinking skills for students in the learning process. The PBL application begins with the orientation of the problem at the initial lecture meeting in the class guided by the instructor. Next, students form small groups and make field observations related to specific learning themes. Students in groups formulate the problems they encounter in the field observation process, and then determine the right solution to the problem. At the end of the learning session, students reflect and conclude the results of the learning activities. This PBL concept emphasizes social skills in collaborative learning, but few train students to become learners of all time by emphasizing individual learning skills to find necessary learning resources outside the classroom.

This paper proposes a conceptual model that implements PBL into the two phases of the life cycle of Software Engineering (analysis phase and design phase) which Pressman (2002) calls "the System Modeling phase." The application of PBL into learning Modeling Software is carried out on three elements in the learning system. First, the Curriculum element emphasizes the use of problems as the starting point of student learning. It delivers conceptual and structured matters related to the discussed issues in each learning session, using a face-to-face model in class (direct instruction) with the Presentation and Brainstorming method. Second, the Student element emphasizes independent learning (Student-Directed Learning). This activity underlines the activity of students independently learning things that are not structural and tangible in the field. 3) Third, Group elements emphasize collaboration. This activity highlights the active participation of students (small groups) in formulating and synthesizing study results independently.

The overall implementation of the three main elements of PBL (problem, independent learning, and group collaboration) at each learning session aims to perfect the Tanner & Scott (2015) model that is oriented towards class meetings that are entirely under teacher's control, the Fakhriah (2014) model that emphasizes small individual learning, and Paez (2017) model that does not emphasize the development of teamwork skills. The PBL concept also aims to perfect the Fonseca, Gomez (2017) model which only develops small-scale communication skills.

3. Methodology

This study uses the Research and Development Method

(R & D), and adapts the stages of Research and Development proposed by Gall at al. (2015). The steps of the study consist of: First, analysis of system requirements involving learning designers, institutional management, and college graduates or the business world as graduate users. They are included in the formulation of competencies in the field of software modeling needed in learning design. Second, development of learning design, following the procedure for developing learning designs proposed by Dick, Carey, and Carey (2015). The development stage consists of two main steps, namely identifying learning needs and developing learning designs. The advanced PBL concept is implemented at the scene of preparing the learning strategy. Third, Formative Evaluation to test the effectiveness of the model.

The effectiveness of the PBL model is tested on one of the learning content modeling software (need assessment). Before being tested, learning content was validated by Software Engineering content experts and Instructional Design experts. Trials are carried out at the formative evaluation stage (field trial). Different forms of test questions (as an instrument to measure the effectiveness of the PBL model in the Software Modeling learning design) were tested on a group of students who programmed Software Engineering courses or Systems Analysis and Design courses in the 3rd year of their lectures. At the end of each trial phase, data analysis and product revisions are carried out based on input obtained from the results of the trial.

4. Results and Findings

Proposed PBL Concept

The application of PBL in the proposed Software Modeling learning design consists of two main phases, namely learning orientation phase and PBL implementation phase. There are ten steps recommended in the PBL syntax, which are tailored to the learning characteristics of Software Modeling, consist of:

1. PBL Orientation
2. Describe the problem & clarify the term
3. Organizing study groups
4. Learn independently
5. Formulate and present problems
6. Designing field investigations
7. Carry out field investigations
8. Small group discussions
9. Making final project documents
10. General discussion forum

Ten PBL steps are implemented in three segments (curriculum, individuals and groups) in the PBL environment, as shown in figure 1.

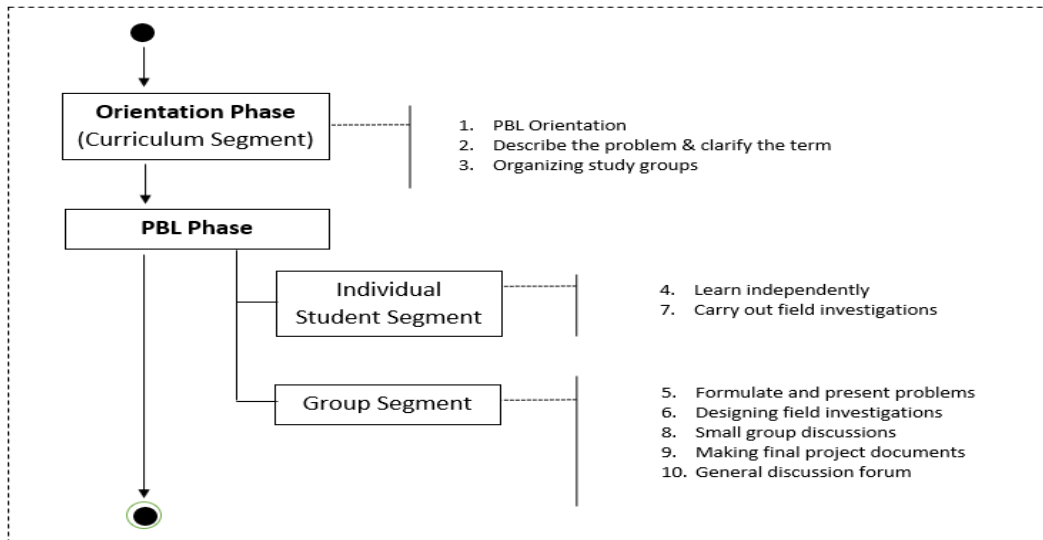


Figure 1. Implementation of PBL Syntax into the Learning Phase

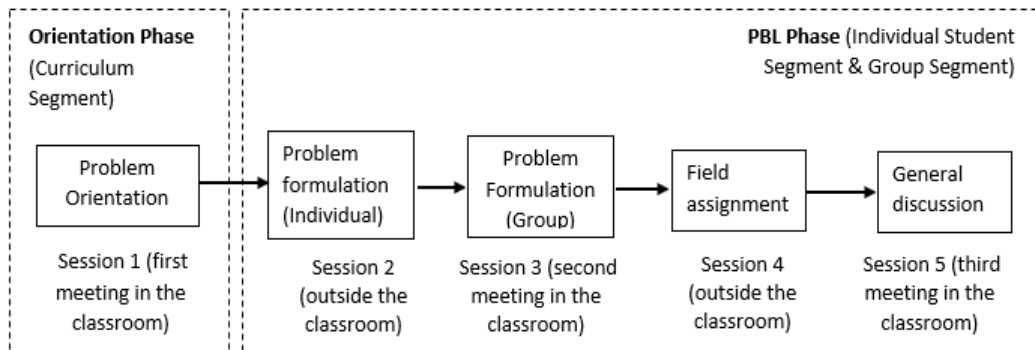


Figure 2. PBL Strategy in the proposed Software Modeling Learning Design

In detail, the Learning Modeling Software strategy in every discussion of a particular theme, presented in Figure 2.

In Figure 2, 1-course topic consists of 5 sessions of activities held in one week. Three activity sessions are held in the classroom involving the interaction of teachers and students. Two meetings are held outside the class that requires students independently or in groups.

Session 1 (Problem Orientation): bring together teachers and students directly in the classroom. There are 3 PBL steps implemented in this session, namely: 1) PBL Orientation (step 1). The instructor explains the learning objectives and achievement plan at the end of the learning session. This session presents PBL mechanisms; 2) Description of the Problem and Clarification of Terms (step 2). The teacher explains the topics or problems discussed in the learning theme. The open discussion is held to clarify basic terms in the learning topic so that students can easily follow learning activities, both individually and in groups; 3) Organizing Learning Groups (step 3). Students form small groups, consisting of 3 to 5 students in one group, and each group prepares to carry out PBL stages, both individually and in groups.

Session 2 (Formulating Individual Problems): is an activity carried out by students individually outside the class. This activity takes place between the 1st meeting and the 2nd meeting. The PBL step that was carried out in the second session was: Self-Study (step 4). Supported by online-based learning media, each student individually conducts a more in-depth study of the fundamental problems described by the Teacher in step 2 using a variety of learning resources.

Session 3 (Formulating Problems in Groups): are activities carried out by students who are members of small groups. This activity was held at the 2nd meeting in the classroom. 3 PBL steps are implemented in the 3rd session, namely: (1) Formulating and Presenting Problems (step 5). Small groups that are formed discuss the formulation of the problem obtained by each group member. Small group discussions produce a problem statement that is ready to be studied further through field assignments. In each little group discussion, group members reflect individually to fill the knowledge gap that has been obtained by each group member. The teacher acts as a facilitator and motivator to motivate students in PBL; (2) Designing Field Investigations (step 6). Small groups prepare a field

investigation strategy related to the problems formulated in step 5. The activities begin independently, and then the results are expressed at small group meetings. Each group prepares a portfolio as an instrument for field investigation.

Session 4 (Field Assignment): is an activity carried out by students individually or in groups. This activity is carried out outside the classroom, between the 2nd meeting and the 3rd meeting. There are 3 PBL steps implemented in the 4th session, namely: 1) Conducting Field Investigations (step 7). Each group member independently conducts field investigations, guided by a prepared portfolio and adapted to the theme of the problem that was carried out in the learning session. Online-based media is available to reach relevant learning resources. Online-based media are used to interact online between fellow small group members, or interact with teachers; 2) Small Group Discussions (step 8). Small group members gather to formulate their findings and discuss to produce the final formulation of their conclusions. Each group member carries out individual reflections, and fills in the gaps in the knowledge gained from each. If group members cannot meet in person, there are online-based media to be used for online discussion; 3) Prepare the Final Project Document (step 9). The formulation of the results of field assignments is stated in the Report on Field Investigation Project, referring to the existing portfolio. Members of the group are accustomed to working collaboratively to complete the Final Project Report. In the end, the small group prepares the presentation material, and then presents it at a public meeting in the classroom.

Session 5 (General Discussion): is an activity carried out by small groups. This activity was held in the classroom at the 3rd meeting. There is the last step PBL implemented in the 5th session, namely: General Discussion Forum (step 10). Small groups present their final findings at a general discussion forum in the classroom facilitated by the instructor. Each member of a little group, practice in

collaboration to show their group's ultimate results. Teachers reinforce each finding submitted by each group. Each group member also makes a final reflection to fill the gaps in knowledge gained by each.

Assessing the Effectiveness of the PBL Model

The effectiveness of the PBL model in Figure 2 was tested on one of the learning content modeling software (need assessment). Before being tested, learning content was validated by Software Engineering content experts and Instructional Design experts. Trials are carried out at the formative evaluation stage (field trial). Various forms of test questions (as an instrument for measuring the effectiveness of applying the PBL model in the Learning Modeling Software design) were tested to a group of students who programmed Software Engineering courses or Systems Analysis and Design courses in the 3rd year of their lectures. The test results are presented in table 1.

There are several problems found in the testing of the application of the PBL model in the Learning Modeling Software, as presented in table 1.

In the first trial of group I respondents, some of the group students seemed confused when implementing each learning session described at the beginning of the lecture meeting, although several modules were provided as guidelines for conducting lectures. Some of them asked the instructor to give a more detailed explanation, even though they were at the end of the lecture session. Even after refining the strategy in the initial description of PBL-based learning procedures, the results of the trials in the group II respondents showed that some students still did not understand the PBL concept in depth. Students always find it difficult to follow the lecture process, so the scores of some students are still less than ideal minimum completeness standards.

Table 1. Effectiveness Test Results for the Application of the PBL Model

Experiment	Respondents	Mastery learning (%)	General Constraints / Revised Item
I	Group I	63	<ul style="list-style-type: none"> - PBL procedures in lectures are not understood - There is not enough time to complete all lecture sessions in one material - Some Passive Students attend lecture sessions
II	Group II	80	<ul style="list-style-type: none"> - PBL procedures in lectures are still not understood - There is not enough time to complete all lecture sessions in one material - Media support in the form of Information Technology is not sufficient for independent learning and online discussion.
III	Group III	96,6	<ul style="list-style-type: none"> - There is not enough time to complete all lecture sessions in one material - Test items are too difficult

In the third trial of group III respondents, the learning modules were designed to be more informative, an explanation of the concept of PBL was given in a more significant portion. As a result, students quickly follow PBL learning procedures. The results of this trial raise several fundamental questions: 1) how many modules are prepared as guidelines for students, so students can easily follow all PBL-based learning sessions. This situation is in line with the findings of Jones et al. (2013) who found many students who were pre-established and needed a lot of guidance for their projects; 2) how long it takes for PBL orientation to students so that students really understand and follow PBL-based learning processes correctly. These questions are in line with the results of Schneider's (2014) study which also raises open debate about 1) how many guidelines are needed in PBL; 2) potential students experience confusion if there is not enough initial learning framework; 3) students who do not have relevant and adequate initial knowledge tend to lag behind.

The problem of inadequate availability of time to complete all lecture sessions on a particular topic consistently appears in several trials conducted. If the time provided for learning is 1 credit within 1 week (Standar Nasional, 2014) and is 160 minutes (50 minutes face to face, 50 minutes structured assignments, 60 minutes independent appointments), then the total time needed to teach 1 lecture topic is equivalent to 3 credits is 480 minutes (8 hours) in 1 week, both for meetings in the classroom, and for learning outside the classroom. Some students stated that the time provided for completing all lecture sessions on one particular topic (8 hours) was inadequate.

The passive attitude of students following the learning session also found in trials. Some students feel bored following the PBL's lengthy procedure, and others think troubled and burdened when they are asked to fill out orderly learning forms, which is new to them. This finding is in line with the statement of Harun, Yusof, Jamaludin, & Hassan (2012) that students' motivation is the key to success in problem-based learning (PBL) implementation. The transition of use direct-instruction teaching methods to PBL instills a negative mindset towards PBL for students who are not familiar yet with inductive learning methods.

Another problem that arises in PBL trials is Information Technology support that is not yet sufficient as an effective communication medium for PBL. Students need effective and efficient technology (Information and Communication Technology) features to support their learning outside the classroom, for example, technology features to support group members' virtual inspiration, and technology features to support group members accessing resources or resources independent learning.

Another finding obtained in the trial of the application of this PBL model is that there is an increase in the number of students who reach the minimum completeness standard, namely 96.6% in the 3rd trial, far higher than the

achievement in Direct-Instruction systems which only reach less than 50%.

5. Conclusions

The application of the PBL model in 3 segments (Curriculum, Individual, and Group) in the learning design of Software Modeling is useful for increasing the level of students' mastery of a particular topic. A lengthy discussion that led to different views regarding the application of the PBL concept in learning offered further research opportunities to find PBL models that were truly effective in learning the field of Software Engineering.

Acknowledgements

Thanks to all staff in the academic field, especially the Chair of the STMIK Banjarbaru Informatics Engineering Department who helped provide data and information, and was willing to facilitate researchers during the trial period for implementing the PBL model in the Software Engineering class.

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Exploring the Digital Game-Based Elements in Mathematics Education: A Meta-Analysis Review

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract This paper is an attempt to analyze critically the existing empirical studies of digital game-based learning courseware in Mathematics education. The major purpose of this meta-analysis is to identify effective game-based element to customize an engaging learning courseware. The meta-analysis was done focusing on Mathematical subjects to understand how digital game-based learning affects the learners' knowledge in mastering new Mathematical concepts. This article review is comprised of 17 empirical studies which were constructed on different framework of game-based elements. The findings revealed that there are twelve essential game-based elements namely fun, play, rules, goals, interaction, outcome, adaptive, winning conflict, problem solving, interaction and representation which are essential to create sense of engaging when adapting DGBL Courseware in Mathematics' education. The systemic review enables the researcher to design a game model for Mathematics learning.

Keywords Digital Game Based Learning, Game Based Elements, Engagements

1. Introduction

Globalization in education brings changes in teaching and learning practices in the classroom. These changes slowly bring crashes into conventional educational practices such as teacher-centered learning, memorization and task-based approaches (Rushton, Hadley, & Stewart, 2016). The overcrowded curriculum with conventional classroom settings is not conducive in the slow learners' learning process (McLaren, Adams, Mayer, & Forlizzi, 2017). Slow learners are students who lack the ability to interpret, process and understand new skills in learning (Vasudevan, 2017). Thus, through the use of Information

and Communication Technology (ICT), educational technology has evolved throughout the years and invented many new strategies to facilitate teaching and learning among slow learners (Zielezinski & Darling-Hammond, 2018). Remedial classrooms are specially designed for slow learners who fail to acquire specific skill of learning (Lim & Leong, 2017). On the other hand, remedial teachers are also exposed to the usage of Digital Game-Based Learning (DGBL) to overcome difficulties in teaching the slow learners (Furió, González-Gancedo, Juan, Seguí, & Rando, 2013). The studies from Tsia (2016) indicate that learners faced greater challenges in acquiring Mathematics' rather than linguistic subjects. Learners experience frustration and struggle with understanding simple calculation in Mathematics. Their lack of ability to interpret the content of Mathematics into application question discourages them from mastering computational skills. Indirectly, this causes the learners to disengage during learning mathematics'. In order to develop engagement in learners, Karimi & Lim, (2010) agreed that the integration of DGBL is an effective method of learning in classroom. Therefore, the main focus of this article is to review selected empirical studies of past researches to identify appropriate game-based elements in specified frameworks in order to customize a DGBL in Mathematics.

2. Game Based Learning in Education

Game-based learning is a type of teaching approach practiced in the classroom to foster student's understanding of learning topics (Abdul Jabbar & Felicia, 2015). Game-Based learning methods used in the classroom can be in the form of physical or digital settings (Yeh, Hung, & Hsu, 2017). In a physical setting, the teachers utilize existing physical game-based materials, by incorporating game elements, as it integrates fun and excitement into

learning (Alaswad & Nadolny, 2015). Usually, the physical game-based learning practiced in school includes hide-and-seek, ball games, card and board games, playground games and role play games, which can stimulate learning among slow learners (Hwang, Wu, & Chen, 2012).

Digital Game-based learning is learning with use of electronic devices as a part of teaching and learning purpose (Lim & Leong, 2017). Game-based learning is also known as media-based learning approach; in school settings, learners use laptop, notebook and computer as a source of learning materials (Khamparia & Pandey, 2018). The above scholars believe that the usage of such media in game-based learning build a meaningful environment for learners to understand complicated, contextual knowledge in an easy way (Murphy, Coover, & Owen, 1989). This is because game-based learning with adapted learning elements will support learners' understanding in specific learning area (Khamparia & Pandey, 2018). In his work, the established scholar, Prensky (2001) defines digital game-based learning as an integration of educational content with game-based elements. The combination of educational content and game-based elements promote learners active participation in learning (Kwon, Lara, Enfield, & Frick, 2013). Apart from that, digital games integration in classroom settings also enhances learners' creativity and raises learners' passionate involvements to construct new knowledge from learning topics (Aesaert et al., 2015). Multiple studies have been conducted in this research field, however there is a lack of empirical studies that substantiate the effectiveness of game-based elements to develop DGBL. The past studies are usually limited to the evaluation of educational games' effectiveness without the consideration of relevant learning theories and game elements (Powers, 1992).

The question that may arise here is whether there is indeed empirical research that offers evidence to confirm the effectiveness of DGBL elements in school settings. The few authors that did concentrate on these game-based elements in DGBL are designated as somewhat outdated since this is a quick evolving and emergent area, especially in the past five years. The findings from this article suggest that valuable game-based element should be incorporated in game designing and to facilitate Mathematics learning. Digital game-based settings commonly utilize computer mediated programs. For example, in DGBL, games are widely accepted in online-orientated learning, courseware-based learning and mobile learning.

2.1. Terms of Games in Education Technology

Game-based learning in the digitalized world uses different terminologies namely Digital Games (DG), Video Games (VG) and Serious Game (SG) (F. H. Tsai, 2018). In the educational field, Digital Games are known as intellectual games that trigger the learners to mindfully

overcome the challenges in the learning context (Connor & Domingo, 2017). These challenges are usually in the form of puzzles or quizzes and could be completed by learners through adapting specific rules (Khamparia & Pandey, 2018). This allows learners to move to a further level in the games. In education, especially, the Digital Games are widely incorporated with interactive game mechanics such as rules, goal, and feedback (Alaswad & Nadolny, 2015). These elements enable players to monitor their progress in the subject learning (Khamparia & Pandey, 2018). Prensky (2001) stated that engaging game-based elements does not just embed game mechanics, but also create a sense of engagement through entertainment activities in the game courseware (Marvel, 2017).

Similarly, Video Games share the characteristics of Digital Games (Ortiz, Bowers, & Cannon-Bowers, 2015). However, Video Games are mainly designed for entertainment purposes only (Tobias, Fletcher, & Wind, 2014). Commonly, Video Games are played in electronic devices such as computer monitors or TV screen devices (Tobias et al., 2014). In the findings of Tobias et al., (2014), it is stated that Video Games are designed to fulfill the need of marketing in the industrial world. Hence, most game developers in the industrial world produce games by placing profit as a main agenda (Kumar Bhowmik et al., 2018). Therefore, learning theories with appropriate game based element is important to customized DGBL Courseware.

In addition, next is the Serious Game, which is also known as educational games (Jong et al., 2017). Serious Game has a specific purpose but lack the entertainment aspects. Serious Game in the educational field includes pedagogical theories and learning strategies (McLaren et al., 2017). However, the Serious Games fail to incorporate entertainment elements to trigger learners' passionate involvement in learning. The main purpose of serious games in education is to develop individual soft skills, for instance, knowledge, experiences and technical skills (Ke, 2013). The above term is used by educationist to describe game based courseware in education.

2.2. Designing Games for Education

Designing games for education is an extensive process (Adamo & Dib, 2013). First of all, designers have to identify the instructional design of their learning courseware. For that purpose, educationists have to adapt the correct instructional approach, relevant learning theories and game-based elements to enhance learners' understanding in the subject matter (McLaren et al., 2017).

2.2.1. Game Based Design Elements for Education

Previous studies in DGBL investigate learners' achievement in learning, learners' motivations and their problem-solving skills (Yeh et al., 2017). However, there is a dearth of studies on integrating game-based elements to

create engaging environment for learning (Fredricks. et al., 2011). The issues are related because the educationists are learnt to have a lack of knowledge and understanding in the importance of integrating game-based elements in DGBL (Akpınar & Sengül, 2018). The learning games that are readily available in the market presently are focused on academic aspects, learning content, different needs of the learners, repetitive exercise, and numerous of facts (Chauhan, 2017). However, these types of learning courseware fail to support learners' engagement in education (Ke, 2013). These game designs eventually create boredom among the learners (García, 2017).

Meanwhile, the established scholars in the game-based field such as Prensky (2001), Wilson et al, (2009) and Aldrich, (2015) claimed that the integration of entertainment game-based elements promotes engagement to learners' active participation in learning (Pesare, Roselli, Corriero, & Rossano, 2016). Fun, adaptive, play, rules, goals, interaction, interaction, conflict, problem-solving, interactive and representation are the key elements in game-based learning (Prensky, 2001). These elements in games integrate both entertainment elements and learning principles (Hamari et al., 2016). For instance, the game elements encourage players to try different ways of learning and thinking in order to master the learning topic (Lim & Leong, 2017). Therefore, game-based elements are important and should be incorporated in DGBL courseware.

2.2.2. Game-Based Learning Theories for Education

Teaching and learning would be incomplete without learners' participation and involvement (Freeman et al., 2014). The DGBL with relevant game element will enhance learners' engagement. Thus, failure to integrate learning theories will cause learners' inability to develop the understanding of learning content (Kose & Arslan, 2015). Educationists used various learning theories to facilitate learners' acquisition in subject areas (S. C. Tsai, 2011). Learning theories are focused on learners' ability to process information during learning. However, not all learning theories have positive effect on learners' achievements (Hirata, 2018). Hence, in order to customize a DGBL courseware, learners' characteristics need to be taken into consideration when determining relevant learning theories that align with the game elements (Muppudathi, 2014). There are three main theories usually adapted in teaching, namely behaviorism, cognitivism and constructivism (Karajeh, Hamtini, & Hamdi, 2016).

Behaviorist theory in courseware explains that the learners' behavioral changes towards learning process (Schlesinger, Wang, Heights, & Macdonald, 1987). Behaviorists defined that learning exists in the condition of rewards and targets (Jagu, Boti, & So, 2018). The theory emphasizes on learners' reinforcement and stimulation, which creates the sense of engagement in learning (Dames, 2016). As opposed to behaviorism theory, cognitivism

theory calls on learners' ability to use the mind to think creatively for problem-solving during learning activities (Adamo-Villani & Dib, 2013). Additionally, compared to cognitivism and behaviorism theories, the constructivism learning theory is complex and comprehensive (Bano, Zowghi, Kearney, Schuck, & Aubusson, 2018). This is because the constructivism learning theory is divided into two aspects, namely social constructivism and cognitive constructivism (Hussein, 2009). In social constructivism, the propellants state that learners construct learning through interactions, while cognitive constructivism has more to do with the assimilation of new information to existing knowledge. The researchers adopt constructivism learning principles, instead of behaviorism and cognitivism, because they argue that knowledge is actively constructed by learners until they account that the particular knowledge suits their understanding. There are three main principles focusing on constructivism theory to bring a significant learning namely knowledge, active learning and meaningful environment (Teo & Koh, 2010). Therefore, it is safe to say that constructivism theory embeds both social and cognitive aspects, which engages learners to participate in game-based learning to construct knowledge (Dames, 2016). Educationists state that constructivism believes that the ability of learners relies on their prior knowledge (Furió et al., 2013). Hence, constructivism theory could be the ideal learning theory to be adapted in designing DGBL as DGBL supports active learning and creates meaningful environment for learners in order to construct knowledge (Theses et al., 1998). In contrast, behaviorism theory seeks for behavioral changes meanwhile cognitivism theory reports on obtaining knowledge by analytical and critical thinking. Therefore, the constructivism theory's attributes are in accordance with DGBL. DGBL enables the advancement in learners by exploring the technology to bring changes in behavioral and cognitive perspectives (Hussein, 2009). Thus, constructivism learning theory integration in learning courseware helps to create engagement in learning. The selection process of learning theories depends on learners' characteristics and their difficulties in learning.

2.3. Research Objective

With growing interest in DGBL, rigorous empirical evidences are needed to support the effectiveness of DGBL elements in learning Mathematics. Mathematics is a computational subject wherein learners frequently use concepts, symbols and numbers in order to solve arithmetic problems (Lim & Leong, 2017). The existing research in Mathematics courseware have explored many variables, namely self-efficacy, self-esteem, engagement, achievements, motivation, concentration and interest (Chauhan, 2017). However, research has been unable to identify the barriers to designing a good educational game and how the designed game can be used in most effective way in the classroom (Marvel, 2017). Thus, the past studies

failed to cover the relevant game-based elements that can engage slow learners' participation in learning (Kiili, Moeller, & Ninaus, 2018). The aim of this study is to identify the empirical evidences of previous research in order to determine appropriate game-based elements in designing and developing an engaging DGBL in Mathematics education by calculating size effect. The findings from this study could provide valuable guidance for educators for further development of learning courseware in Mathematical field.

3. Methodology/ Materials

The articles involved in this study were selected systematically. A key word search was conducted in four databases namely Science Direct Journal, Web of Science, Springer and Scopus. The terms that have been used to collect the articles are, "Digital Game Based Learning", "Serious Game", "Video Game". These descriptors were derived from an initial, non-systematic exploration of the literature. The terms "(study or research)" were respectively used to focus the search on empirical research studies because the aim was to retrieve studies on the educational effectiveness of games. The articles were taken from a fixed time limit by the researcher, which is in the range of year 2015 to year 2018. Based on online databases mentioned above, a total of 142 articles, related to game-based field in Mathematics' education, were collected. Thereafter, the researcher selected 17 articles (out of the 142 articles) which were related to Mathematics education and aligned with the constructivism principles. The articles that complied with the following criterion were kept; the article describes empirical studies (quasi-experimental) that made use of a

computer-based-game in Mathematical educational setting and integrates constructivism theory and game-based elements. The 17 articles were then studied thoroughly to identify the respective game-based elements that were used to propose DGBL. Overlaps were immediately excluded and all abstracts were read through. The researcher excluded the articles that were irrelevant to current studies; whereby studies that discussed the general framework, collected data based on qualitative analysis, and had no constructivism elements principles or systematic review of DGBL were removed. Based on these filtered articles, only 17 articles could be utilized for this study. Table 1 shows an overview of the collected data from the online databases.

Table 1. Overview of Collected data from various of online database

Online Database Source	Articles related to Game based learning in Mathematics'	Articles with empirical studies
Web of Science	32	5
Science Direct	77	9
Springer	19	1
Scopus	14	2

Table 1 shows the articles that reported on studies have empirical findings. All these studies were adapted from various frameworks of game-based elements, which were constructed by five main scholars namely Alessi and Trollip, 2001; Prensky, 2001; Wilson et al., 2009; Vogel et al., 2006 and Aldrich, 2005. Table 2 illustrates the game elements and the respective scholars who had constructed these elements of design and development in game-based learning. Table 2 also clarifies the research domain and number of articles that correspond to each scholar and game-based elements.

Table 2. Scholars and invented Game Based Elements

Scholars	Game Based Elements	Research Domain	Numbers of Articles
Alessi and Trollip, 2001	Feedback, Multitasking, making decision, Strategy, Chance, Conflict and problem solving	Cognitive	2
Prensky, 2001	Fun, Play, Rules, Goals, Interaction, Interactive, Outcome, Winning, Conflict, Problem Solving, Adaptive, Interaction, and Representation	Cognitive, Affective and Behavioral	7
Wilson et al., 2009	Fantasy, Representation, Sensory Stimuli, Challenge, confusion Mystery, Assessment and Control	Cognitive, Affective and Behavioral	1
Vogel et al., 2006	Fun, Participation, Interactions, ,	Behavioral	4
Aldrich, 2005	Graphics, emotion, attitude	Affective	3

Table 2 shows that the game-based elements developed by the above scholars were adapted by all the 17 studies that were reviewed in this current study (see Table 3). The articles above were then further analyzed to identify the elements used to customize a game-based courseware. After identifying the elements that were incorporated in all the selected studies, the researcher compared the elements with five frameworks proposed by Alessi and Trollip, 2001; Prensky, 2013; Wilson et al., 2009; Vogel et al., 2006 and Aldrich, 2005. The 17 selected articles with empirical studies were then critically reviewed based on the following aspects, author, year of publication, game name, game type, game framework and game element, size effect and description of size effect (see Table 3).

Effect size is a simple way of quantifying the difference between two groups (Cohen, 1988). The effect size calculation is valuable for these studies because quantifying the effectiveness of these 17 articles' in game intervention will enable the researchers to identify relevant framework elements to adapt design courseware. Therefore, the studies adopted the below formula to calculate the effect size of each articles.

$$Cohen's\ d = \frac{M_1 - M_2}{SD_{pooled}}$$

M1 = Mean of Treatment Group

M2= Mean of Control Group

SD = Standard deviation of two groups (SD1 + SD2)

Table 3 showed the values of estimated effect size to describe the effect of intervention in the 17 selected articles.

Table 3. Estimate Effect Size of Cohen's d

Effect Size	Description of effect
Cohen's d = less than .2	small
Cohen's d = is between .2 and .8	medium
Cohen's d = greater than .8	large

Adapted: Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences

4. Results and Findings

4.1. Meta-Analysis of Digital Game-Based Learning for Mathematics'

Table 4 represents the meta-analysis of Digital Game-Based Learning articles from year 2015-2018 in Mathematics' education. All selected articles adapted game-based elements from scholars as stated in Table 2 to customize the learning courseware. Table 4 shows the Meta-Analysis of Digital Game-Based Learning for Mathematics.

Table 3 shows that, in designing and developing game-based courseware, 7 studies adapted the Prensky (2001) framework, 2 studies adapted Alessi and Trollip, (2001), 3 studies used Aldrich, (2005), 1 study adapted Wilson et al., (2009) and 4 studies integrated Vogel et al., (2006). However, based on the articles reviewed, none of the studies incorporated all the game-elements developed by the respective scholars. The researchers claimed that it would be complex and complicated to integrate more than five domains of respective elements in a single game courseware. The adaptation of game elements by 17 researchers are recorded in Table 5. Table 5 demonstrates the details of game-based elements employed in the selected studies.

Table 4. Meta-Analysis of Digital Game Based Learning for Mathematics'

Author	Game Name	Game Type	Game Framework	Game Elements	Effect Size	Description of Effect
Hamari et al., (2016)	Quantun Spectre	Serious Game	Prensky, 2001	Challenge Fun adaptive	0.220	Medium
Riemer & Schrader, (2015)	Quiz, Simulation, Adventure	Serious Game	Prensky, 2001	Play Goal Enjoy adaptive	1.220	Large
Jong, Vandercruysse, Wouters, Oostendorp, & Elen, (2015)	Competition and Collaboration game	Computer Game	Alessi & Trollip, 2001	Feedback Multitasking Conflict Problem solving Competition	0.691	Medium
Volk, Coti, Zajc, & Istenic, (2017)	Cross Curricular Maths	Video Game	Prensky, 2001	Outcomes Problem Solving Interaction Enjoy Feedback	0.250	Medium
Kili et al., (2018)	Rational Number Training Games	Educational Game	Wilson et al., 2009	Play Feedback Reinforcement Level Problem Solving	0.101	Small

Jagu et al., (2018)	Tablet Game	Educational Game	Aldrich, 2005	Graphic Emotion Attitude	0.553	Medium
Novak & Tassell, (2015)	Action Game	Video Game	Prensky, 2001	Problem Solving Interaction Feedback Play Win	0.781	Medium
Jong et al., (2017)	Action Game	Computer Game	Prensky, 2001	Level Goal Interaction Challenge Representation Adaptive Rules	1.55	Large
Mahmoudi, Koushafar, Amani, & Pashavi, (2015)	Action Game	Computer Game	Vogel et al., 2006	Fun Problem Solving Interaction	0.553	Medium
Baker, Martin, & Aghababayan, (2015)	Fraction Game	Educational Game	Aldrich, 2005	Graphic	0.801	Large
Mccarthy, Tiu, & Li, (2018)	Narrative Based Game	Online Video Game	Wilson et al., 2009	Winning Interaction Play Representation Problem Solving	0.710	Medium
Fokides, (2018)	Kodu Game	Digital Game	Vogel et al., 2006	Fun Participation	0.236	Medium
García, (2017)	Algebra Game	Computer Game	Vogel et al., 2006	Fun interaction participation	0.460	Medium
Holgersson, Barendregt, & Emanuelsson, (2016)	Virtual Finger Game	Computer Game	Prensky, 2001	Interactive Narrative Goal Feedback Play Winning	1.327	Large
Yusoff et al., (2017)	Maths Game	Digital Game	Prensky, 2001	Interactive Narrative Goal Problem Solving Play Adaptive	1.458	Large
Tsia & Yen, (2016)	Fraction Game	Digital Game	Aldrich, 2005	Attitude Graphic	0.342	Medium
Venter, (2016)	Math Game	Mobile Game	Alessi & Trollip, 2001	Feedback Strategy Chance conflict	0.557	Medium

Table 5. Descriptive Analysis of Game Based Elements in Learning Courseware

Engagement Domain	Game Elements	Game Elements Description	Number Of Articles Related to Game Elements(n)	Percentage (%)
Affective	Attitude	commitment	2	3.17
	Rules	Structure	1	1.58
	Representation	Emotion	4	6.35
	Win	Ego Gratifications	3	4.76
	Emotion	Feeling	1	1.58
	Interactive/graphic	Attention	5	7.93
Cognitive	Conflict/Challenge	Thinking	4	6.35
	Adaptive	Flow	4	6.35
	Problem Solving	Spark creativity	7	11.11
	Outcome/Feedback/reward/reinforcement	Learning	8	12.69
	Multitasking	Various activities	1	1.58
Behavioral	Fun/enjoy	Enjoyment and Pleasure	6	9.52
	Play	Intense involvement	6	9.52
	Goal/Competition	Motivation	5	7.93
	Interact/collaboration	Social Groups	6	9.52

n= Number of articles

Table 5 provides an overview of the game elements, their description and percentage of studies that incorporate these elements that we found in the empirical studies. The data from this table are further discussed below. Based on Table 5, it is obvious that the ‘outcome’ element is the most used element compared to the rest. This element was adapted in 8 studies which correspond to 12.69%. The outcome element refers to the statement that describes significant and essential learning that learners have achieved and can reliably demonstrate at the end of usage of learning courseware. The study conducted by García (2017) examined the effect of serious game on learners’ training on task performances, engagement and knowledge. This study reflected a positive outcome after applying digital game-based learning approaches. The finding of this research also supported the notion that DGBL practices bring positive effect compared to non-gamified environment. Therefore, in games, the outcome element typically helps learners to distinguish the objective of learning, which further allows learners to accomplish the goal of the games (Volk, Coti, Zajc, & Istenic, 2017). Apart from that, based on the outcome of the completed activities, learners can correct their mistakes (Furió et al., 2013). Thus, it reduces the misconception during problem-solving activities (Paris, 2017). Therefore, the outcome element in game-based learning courseware is a crucial element to enhance learners’ engagements in learning.

Next, the second most used game element is ‘problem-solving’. This element was used in 7 articles out of 17 articles, which is equivalent to 11.11%. According to García (2017), problem-solving is a form of thinking. The study of Yusoff et al., (2017) argued that the existence of

problem-solving activities indirectly influences learners’ interaction with their group of learning. (Baker et al., 2015) in his research, he found that both problem-solving and interaction correlated with each other in a way to maximize learners’ understanding in Mathematics. Thus, the incorporation of problem-solving element in game-based learning enables learners to identify the problem and seek relevant methods to solve it. Many scholars argued that situating slow learners in a gamified environment eventually promote their problem-solving, engagement and motivation (Lim & Leong, 2017). The research done by Fokides, (2018) compared two groups of students. Learners whom were taught with Kodu Maths learning coursewares showed a positive effect in solving problems with link to Mathematics learning.

In addition, the findings also show that three elements, ‘play’, ‘fun’ and ‘interact’, recorded 9.52% respectively. These three elements are in the behavioral engagement domain. Proponents stated that the play element in games enhances learners’ participation in learning (Mantiri, 2014)(Coulthard, 2017). According to Mccarthy, Tiu, & Li, (2018) the play element creates an intense and passionate involvement in learners to adapt games as a form of learning material and as a way to construct new knowledge. Holgersson, Barendregt, & Emanuelsson, (2016) stated that embedding playful task in game-based learning fosters learners’ creativity. Learners use their thinking ability in order to complete activities like puzzles or quizzes. Novak & Tassell, (2015) investigated that the relationship between the time of usage of game between two groups. The learners who play the game for 10 hours show significant improvement in memory and gemotery

performances. Therefore, the play element assists learners to achieve the desired learning objectives.

The fun and interactive (5.73) elements considered one of the complex element in game based learning (Karimi & Lim, 2010). Fun in learning gives a sense of enjoyment and pleasure (Tham, 2012). In order to create the enjoyment in learning, games should adapt high interactive attributes to retain learners' concentration in the games (Adamo-Villani & Dib, 2013). Therefore, the interactive element in game-based learning is correlated with fun environment. The research conducted by Tsia & Yen, (2016) stated that there is positive correlation with fun and interactive elements in their studies. Findings of the research show that learners seem to find the games easier to play and less frustrating because the instructions were easy to understand with the help of graphical animation. The graphical animation also makes the learning enjoyable. Thus, graphical animation engages learners in an effective way towards leaning. In addition, representation element in DGBL refers to story or narrative contents. Representation element in game-based learning offers a conceptual framework to structure game learning courseware. Games for learning are most effective when multiple sessions are involved, in other words, when users replay the game. The results indicate that the representation elements (fantasy stories) influence learners to immerse themselves in games. Indirectly, the representation element integration will lead to learners' contextual understanding.

Not only that, conflict in games create mood of excitement in learners to explore the games. Based on the studies above, it is noted that 4.35% of the selected articles (4) integrated conflict element in game-based learning. According to Vandercruyssen et al., (2015) conflict in learning emerges when the players try to complete the assigned task to reach target goals. The research conducted by Jong et al., (2017) used faded worked examples in computer games. The findings of the research showed that effective integration of challenge element will improve the potential of players to accomplish the goal of the game.

Element such as rules, emotion and multitasking reported only 1.58%, which were only adapted in one study to design and develop game-based learning. Win element creates ego gratification emotions, while multitasking elements is related to the challenge of doing various activities in order to master learning contents (Vogel, Greenwood-Ericksen, Cannon-Bowers, & Bowers, 2006). Meanwhile, the rules elements possess different characteristics across various games. The rules in game generally constrain learners from being too intense and passionate in the games. Learners may feel that the rules in the game delay or decrease the chances of winning the game. However, Prensky (2001) stated that the rules element is a compulsory element to prevent players from cheating. For instance, without the rules, the students might use other electronic devices to complete the mathematical problems (Ortiz et al., 2015). Although certain

game-elements such as rules, interactive, win/level/score are reported to have low percentage, the integration of these elements is equally important in designing a game-based learning courseware.

The findings revealed that most of the studies used Prensky's (2001) framework in their research to develop game courseware. They claimed that Prensky (2001) game elements are comprehensive in nature for the creation of educational materials, while simultaneously providing the most engaging educational experiences for students. It is also supported by the findings in this study, whereby 7 articles out of the 17 articles adapted Prensky's (2001) gaming elements to construct Mathematical learning courseware. Hence, based on the study conducted above, designers and developers should take Prensky (2001) into consideration when customizing learning courseware. In addition, it is clearly stated by Vygotsky (1978) that meaningful learning in the constructivism perspective enables learners to explore a content material in order to derive a new knowledge. Thus, DGBL Courseware in educational field should integrate game-based elements to promote learners' achievement and engagement in Mathematics education.

5. Conclusions

The discussion above detailed that the integration of relevant game-based elements can enhance learners' engagement in learning Mathematics. Failure in the integration of these elements in games in classroom settings would impact the learners' arithmetic skills acquisition. This study uncovers some essential information regarding relevant game-based elements frameworks that need to be in place in order to produce a highly impactful DGBL courseware.

Acknowledgements

The authors would like to thank Universiti Teknologi Malaysia and Ministry of Higher Education Malaysia for their support in making this project possible. This work was supported by the Fundamental Research Grant Scheme (R.J130000, 7831.4F932) initiated by Ministry of Higher Education.

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The Computer Assisted Instruction Model Based on a Combination of Tutorial Model and Drill and Practice Model in the Instructional Design of Database Systems in Information Technology Colleges

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract The traditional face-to-face teaching methods in the class that emphasize teaching-centered learning systems caused teachers to be unable to deliver teaching material thoroughly because of the limited time. The Computer Assisted Instruction (CAI) model presents learning by using a variety of media, both in the form of text, images, and in the way of interactive videos, so that it helps the learning process effectively and helps students to set the pace of learning independently anytime and anywhere. Interconnection of the CAI model with online-based technology also helps students improve their learning creativity, because diverse learning resources support it. This paper presents CAI conceptual models based on a combination of Tutorial models and Drill and Practice models, which are supported by online technology to provide conceptual understanding at the beginning of learning and offer exercises to develop creativity and test students' abilities in the final stages of learning Database Systems. The evaluation results on limited trials show that the CAI model design based on a combination of Tutorial models and Drill and Practice models much motivates students to learn and improve mastery of competencies in the Database System. Another finding in this paper is the need to provide adequate guidance for the application of CAI in its use, and the obligation to provide more effective designs when CAI applications are designed to connect to systems that offer to teach resources online, so students really can use CAI as an auxiliary media active learning for independent learning.

Keywords Interactive Learning Media, Computer Assisted Instruction, Drill and Practice, Tutorial, Database System

1. Introduction

Information System is the process of collecting data that is processed into information that is useful for the users (Hasan, Shamsuddin, and Aziati, 2013). The information generated becomes the basis of policy considerations. Ward and Prepard suggest that there are three main goals of the application of Information Systems in an organization. These three things are improving work efficiency by automating various processes that manage information, improve management effectiveness by satisfying information needs for decision making, and improve competitiveness to improve the organization's competitive advantage by changing the style and way of doing business (Setiawan, Ilman, 2012). Al-Mamary, Shamsuddin & Aziati (2014) stated the same thing that Information Systems aims to provide accurate, relevant, and complete information to managers to improve organizational performance. In its application, the ability of a company to gain a competitive advantage is determined by how the information system is managed and used correctly so as to improve service and reduce operational costs (Ramaya, Omar, 2010), increase company productivity (Oliveira, Martins, 2011), improve team performance (Choi, Lee & Yoo, 2010), and make it easier for management to make effective decisions (Rabren, 2010).

One crucial part of the Information System is the Database System. The database is the principal strategic part of Information Systems to support management in making decisions (Piattini, Diaz, 2000). The database

system provides a flexible means of access, protects data from damage, and avoids illegal use. The database system provides a mechanism for shared use such as data connectivity to minimize data pooling, maintain data integrity, and eliminate data dependence on application programs. The database system also standardizes the definition of data elements (Elmasri, Navathe, 2016).

Effectiveness, The design of a database system that is a constituent element of an information system significantly, influences the success of the information system. A useful database system design makes it easier to reuse the data contained in the database system, thereby increasing the quality of the information system. When an organization needs a new application, and at the same time the design of its database system is available properly, then the system developer (programmer) only needs to make the interface required by the user to connect to the open database system. For this to work, the design of a database system must be well prepared to support future system development. Therefore it is essential to offer a useful database system to support data access requests for users or other systems. Knowledge of the database system is needed by everyone who wants to take part in the development of information system technology.

Studying in the field of informatics is one way to gain knowledge about database systems. The Joint Task Force on Computing Curricula Association for Computing Machinery (ACM) and IEEE Computer Society in 2013 put Database Systems as one of the study areas for Undergraduate Degree Programs in Computer Science (IEEE Computer Society, 2013). The Australian National University using the ACM-IEEE Computer Science Curriculum in 2015 also places database systems as one area of study (Milthorpe, 2017). Schildkamp, Lai, and Earl, (2013) suggested that the database system received a lot of attention in the field of education, especially in the Computer Science program.

We conducted a preliminary study on the Information Systems Department of STMIK Banjarbaru, one of the Higher Education Information Technology Institutions in Indonesia which contains a Database System in its teaching curriculum. Higher education uses traditional face-to-face teaching methods in classrooms that emphasize teaching-centered learning systems. We conducted a study using questionnaires aimed at teachers and students, as well as making direct observations in the class that held Database Systems lectures. The results of our research show that direct teacher-centered teaching methods in the database system lectures cause the learning process to be passive, students' understanding is not optimal in certain parts of competence, and the atmosphere of learning in the classroom is boring. Some students seem to need special attention and handling at the time of learning, but cannot be handled by the teacher because there is not enough time to do direct assistance. This condition is in line with the findings of Simarmata et al. (2018) which suggest that

teachers face difficulties in conveying all the material in conventional learning because of the limited time allocation, consequently lagging students follow learning, and cause students unable to reach the minimum competency standards planned in the learning design.

Using a student-centered learning model allows teachers to make time to correct specific student problems, consult with students individually, and teach one by one in small groups. The use of learning technology can help alleviate the work of the teacher, helping them become creative classroom managers, rather than just as information dividers. Idris, Ali, Rajuddin & Muhammad (2012) stated that teaching and learning strategies that focus on students make students active, creative, and focus on exposing various problems and challenges.

One learning model that utilizes student-centered learning technology is Computer Based Learning. Computer-based learning is an interactive learning approach in which computers replace the role of an instructor. Computer-based learning provides instruction, tests, and student learning feedback independently, with very little or no teacher involvement (Darmawan, 2011). Computer Assisted Instruction (CAI) is a form of computer-based learning that uses models of tutorials, exercises and practices, simulations, and problem-solving approaches to present topics, and test students' understanding. These programs allow students to study material at their own pace.

The teaching system has tested many of the uses of the CAI model. Widayanti examined the use of CAI in the Class X Operating System subjects at Vocational High Schools in Indonesia. The study showed students' responses to learning media amounted to 73.75% included in the good category, and students' learning outcomes were at an average of 82.00 in the post-test (Widayanti, 2016). Suleman, Hussain, Din, and Iqbal (2017) tested the effect of CAI on the teaching of high school students' physics. They found that CAI-based teaching had a significant positive effect on students' academic achievement and retention in Physics, and recommended the use of computer-assisted teaching techniques for science teachers. Previously Rahman, Ismail, and Nasir (2014) have also tested the effect of CAI on teaching Physics (Movement and Vector Analysis) for high school students. Their findings indicate that there is an increase in learning motivation and students' conceptual understanding of learning using interactive software media.

This paper presents the concept of interactive CAI-based learning technology using a combination of tutorial models and drills and practice models on learning Database Systems in the Information Systems Department of STMIK Banjarbaru.

2. Literature Review

In recent times, learning database systems have used

several methods.

Demour (2010) proposed a Cognitive Training-based approach to teaching Relational Database Design and Analysis. This approach divides the stages of learning into three main phases. In the initial stage, breaking down the database design process into manageable phases then sets the completion and completion procedures. The pedagogical process continues by introducing students to the theoretical basis of each step they follow, by introducing practical examples of that phase. Next, divide students into groups in class and give assignments in the form of small problems to them. One of the requirements of the course is the delivery of real-life issues that represent students' understanding of the concept of the course. Students work on these projects in groups outside the class that have different members than those in the class. The results of the achievements in the experiment show that this approach is practical, easy to implement, increases student motivation, and can achieve a higher level of learning.

Learning Database Systems supported by eLearning were introduced by Paulova, Tesarova, and Manenova (2010) at the Faculty of Management and Information, University of Hradec Kralove. The subject of observation is students' performance in the cognitive field (memory, understanding, and application of acquired knowledge). Learning outcomes of Database Systems supported by well-designed and appropriately implemented eLearning are comparable to the results achieved by students from traditional face-to-face lessons.

Yuelan et al. (2011) proposed combining various methods in learning database systems. First, the use of multimedia technology to simulate the processes and effects of database systems can motivate students to increase the efficiency and quality of teaching. Second, a project-based approach based on constructivist learning theory has an impact on students to be more familiar with system operations, so they can concentrate on the main objectives of database studies without having to spend a lot of time analyzing business processes. Third, applying an experimental model of teaching in trials. Combining theory with practice will help students master basic theoretical knowledge, enable students to learn scientific knowledge, and foster independent learning skills and motivate their enthusiasm for learning. The concept of using various methods allows students to train the use of integrated experience to solve practical problems and create thinking skills.

Mason (2013) introduced a practicum-based learning model on the teaching of Database Administration at Regis University College for Professional Studies (CPS). Regis database practice encourages the development of soft skills by allowing students to volunteer in leadership roles, such as Project Managers, Technical Leaders and Project Leaders. Students improve communication skills by working on software development projects in real life. Students create and maintain databases used for all

undergraduate and graduate database programs in CPS. The results of the learning evaluation indicate that the Regis database practicum is a successful experience that helps students perfect their technical skills and to develop new soft skills. This Regis database learning model aims to inspire students to continue to study the subject of database technology after they graduate.

Hilles (2017) proposed the teaching of Database Systems using interactive learning media based on computer. They gave the name "MDB," a Knowledge-Based Smart Learning System. The purpose of building MDB is as an education system using author tools. The MDB system observes student actions and adapts to their knowledge and learning abilities. MDB's intelligent tutoring system helps students understand, build, and use databases. MDB's thoughtful guidance divides teaching materials into lessons, examples, tiered exercises, and examinations.

We propose the concept of learning based on Computer Assisted Instruction (CAI) using a combination of Tutorial model and Drill and Practice model on learning Database Systems in the Information Systems Department of STMIK Banjarbaru - Indonesia. The CAI model based on a combination of Tutorials and Drill & Practice provides conceptual understanding at the beginning of learning and offers unstructured exercises to develop creativity and test students' abilities in the final stages of learning. This model also offers interconnection facilities to online systems that offer resources to enrich students' insights in developing learning concepts, so that they can truly become effective assistive media for independent learning.

3. Methodology

In this work, the Research and Development (R & D) method is used to develop CAI-based interactive learning designs. R & D is a method used to build and test the effectiveness of a product. We use the Research and Development (R & D) research model proposed by Gall, Gall, and Borg (2015) in the initial stages of research, then follow the scenes in the model of development of learning design proposed by Dick, Carey, and Carey (2015) as recommended by Gall and Borg. The research steps consist of:

1. Analysis of problems and system requirements. The Focus Group Discussion (FGD) method was used to formulate the competencies needed in the Database System learning design. The FGD involves instructional designers, heads of study programs in universities, college graduates, and college graduates.
2. Development of learning design using the Dick & Carey development model. The stages of development consist of (1) identifying general instructional objectives, (2) conducting instructional

analysis, (3) identifying behavior and initial characteristics of students, (4) writing specific instructional goals, (5) developing assessment instruments, (6) developing strategies learning, and (7) developing instructional materials. The seventh stage of developing learning design (developing learning materials) is the stage for implementing the CAI Concept based on a combination of Tutorial models and Drill and Practice models.

3. The formative evaluation process of learning design uses the Dick & Carey model. Developmental evaluation stages consist of (1) expert validation (instructional design experts, content experts, and media experts / Information Technology), (2) one-on-one evaluation by students. At the end of each phase of the trial, data analysis and product revisions are made based on input obtained from each evaluation/trial stage.
4. Test the effectiveness of the instructional design. The effectiveness of the model is tested using pseudo-effectiveness tests, namely testing the model in conditions that resemble actual conditions. Assessment of model effectiveness was carried out in small group trials. Nine students who have characteristics of the high, medium and low ability become respondents at the trial stage. The model effectiveness test stage consists of:
 - 1) Conduct an initial test to determine the students' initial competencies by referring to the learning objectives
 - 2) Explain to students the purpose of the evaluation, and explain the learning activities carried out, and encourage students to comment freely at all times during the evaluation activities.
 - 3) Carry out learning activities by sharing with each student a CAI-based learning application (valid and perfect based on the results of expert evaluation) to be used.
 - 4) Carry out the final test using a test that is equivalent to the test used in the initial analysis
 - 5) Share questionnaires to get students' assessment of the quality of the design of CAI produced
 - 6) Conduct interviews with several students to gain more in-depth ratings and comments about the quality of CAI products, which include:
 - How easily learners understand the lesson using CAI products
 - How systematic and exciting is the use of CAI products
 - Which part of the experience is challenging to understand and why

- Conformity of planned time in the design of learning with the time used to study and master the material.
- How effective illustrations/ graphics/ graphics/ videos help to understand the material
- Compatibility of material with test items (relevance and level of difficulty)

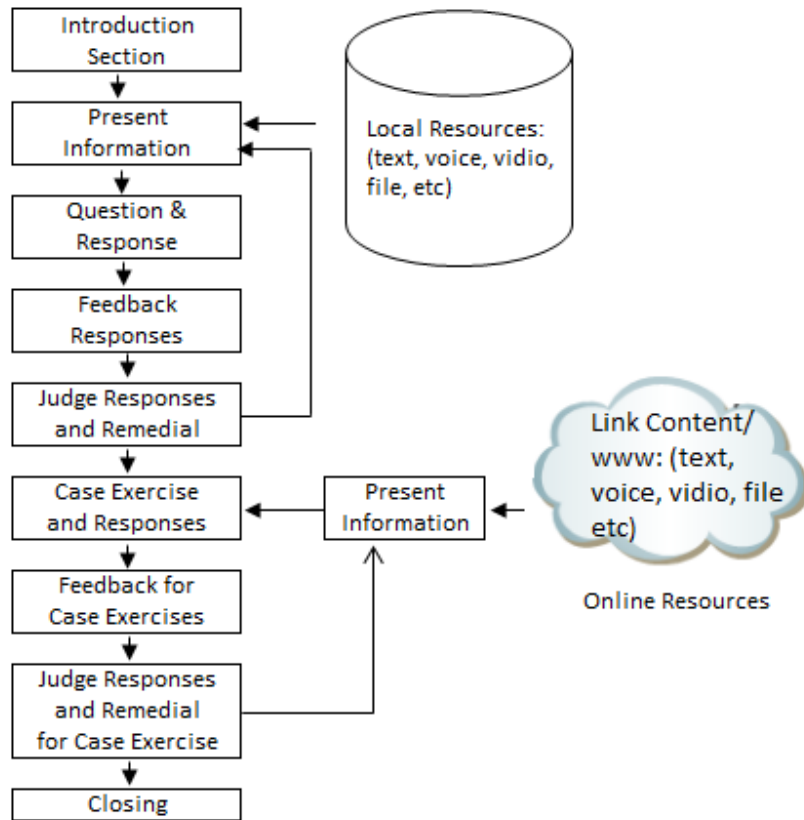
- 7) Using the results of a small group evaluation to revise the CAI product design, until the competency mastery test results reach the required minimum standards.

4. Results and Findings

4.1. Proposed CAI Concept

Database System Topics generally consist of two programs. The first part is logical analysis and design, consisting of Requirements Specification and Requirements Analysis, Data Modeling, Relational Mapping, and Normalization. The second part is the physical design and implementation with the Data Base Management System, consisting of SQL: Data Definition Language, SQL: Data Manipulation Language. The concept of needs analysis and requirement specifications is a program that is oriented to user needs so that the scope of the study is unstructured problems. The design and implementation must follow the needs analysis and requirements specifications. The characteristics of the database system course require the use of learning methods not only to emphasize conceptual understanding but also to practice in-depth exploration of unstructured cases.

Tutorial models in CAI based Tutorial (Lestari, 2015; Seow, Pan, 2017) are learning strategies developed for material that has characteristics: new information, conceptual nature, and emphasizes the optimization of achievement of cognitive aspects. The Drill model as in (Pacol, Patacsil, 2018; Pujawan, 2018) provides learning experiences through the creation of imitations of forms of expertise that approach the real atmosphere through the provision of exercises to develop creativity and test students' abilities (Darmawan, 2011). The characteristics possessed by the Tutorial model and Drill model are in line with the learning characteristics of database systems that require learning concepts that emphasize conceptual understanding and require deep practice to expose unstructured cases. Our paper proposes a CAI model based on a combination of Tutorial and Drill and Practice models for learning database systems, as shown in Figure 1.



Picture 1. CAI-Based Procedural Model of Combination Tutorial and Drill & Practice

The CAI model in Figure 1 runs on a Web-based platform or a CMS (Content Management System) application such as e-Learning. The system is used to help students learn independently anytime and anywhere, and also in classroom teaching with teacher’s assistance. The CAI procedure based on the combination of the proposed Tutorial and Drill & Practice consists of 9 steps as follows:

1. Introduction Section. The CAI system displays instructions or learning steps.
2. Present Information. The CAI system presents material sourced from the CAI system's local resource applications in the form of tutorial scripts. Presentation of information in the form of visual information other than text such as images, graphics, photos, and images /videos.
3. Question and Response. The CAI system presents issues and assesses the extent to which students can remember and understand the lessons offered. This stage is an integrated evaluation stage in the material presentation stage.
4. Feedback Response. The CAI system provides feedback as a reaction to the responses given by students. The feedback function is to inform whether the answer given by the student is right or not. Input in the form of messages in the form of text and graphic illustration forms. If the response

given by students is correct, the program reinforces students. But if the student's answer is wrong, the program provides a sentence with a statement that the response given is incorrect.

5. Judge Response and Remedial. The CAI system evaluates students' answers/responses so they can provide feedback for students. Assessment functions to assess students' learning outcomes and make a decision whether the learning process can be continued to the next stage or repeated. Repetition takes the form of restatement of material that students have seen, sourced from local resources.
6. Case Exercise and Response. The CAI system presents questions in the form of new case studies, but is still relevant to the materials that have been studied / seen by students, and assesses the extent to which students are able to develop certain material they have acquired. Students can reach this session if they have gone through and mastered perfectly all the main material of learning.
7. Feedback for Case Exercise. The CAI system provides feedback as a reaction to students' responses (as in step number 4)
8. Judge Response and Remedial for Case Exercise. The CAI system evaluates students'

answers/responses so they can offer feedback to students. Assessment functions to evaluate the results of case training and decide whether the learning process can continue to the next stage or return to its first stage. Repetition in the form of presentation of enrichment material sourced from online resources/internet (www, download files, You Tube, etc.) to enrich students' insight before doing the case rehearsal. This concept can train students to think critically and develop ideas into available material.

9. Closing. The CAI system presents a summary of information about lessons in the form of the main points of a paragraph about learning objectives and provides recommendations for further learning.

The first step to the fifth step is the underlying logical

structure of the Tutorial-based CAI model, while the sixth step to the eighth step is the core of the Drill and Practice-based CAI model. Both of these models are integrated resulting in learning logic procedures in the form of applying the Tutorial system at the beginning of teaching to provide conceptual understanding for students and at the end of the teaching offering exercises to develop creativity and test students' abilities.

4.2. Assessing the Effectiveness of the CAI Model

The assessment of the effectiveness of the CAI model in Figure 1 takes place at the stage of the formative test of small group students (nine students who have characteristics of high, medium, and low ability) according to the procedure of research methodology. Evaluation results are as in table 1 in table 1:

Table 1. Effectiveness Test Results for the CAI Model Application

Experiment	Pretest Completeness Average (%)	Posttest Completeness Average (%)	General (major) Evaluation Results
I	21,2	90,7	There are several paragraphs in the learning material that are not clear in the meaning of the sentence Students need explanatory help when students encounter obstacles in understanding teaching materials Need to complete learning materials need to be with adequate case examples Students are very motivated by the learning and training scenario models offered in the application, but the completion time of one learning session feels too long so that there is a feeling of boredom in the final stages of learning Illustrations in the form of images still need to be presented more interesting time used to study and master a particular competency beyond the time planned in the learning design
II	20,8	92,4%	Students still need explanatory help when students encounter obstacles in understanding teaching materials Time used to study and master a particular competency beyond the time planned in the learning design The completion time of one learning session feels too long to cause boredom in the final stages of learning Instructions for using the application are unclear so that it requires assistance at the beginning of the application

Based on the results of the effectiveness test of using the CAI application based on a combination of Tutorial models and Drill & Practice models as in table 1, we discussed some essential findings as follows:

First: There are eight of the nine respondents in the first and seventh stages in the second stage test stated that the learning and training scenario models offered in the CAI algorithm hugely motivated students in learning and training. The percentage of learning completeness that reaches 90 % supports this statement. This finding is also consistent with the results of Thomas et al. (2013) and Suleman et al. (2017) which concluded that CAI-based learning could motivate and improve students' achievement. However, the other side of success is that respondents generally feel that they are bored in the final stages of knowledge because the process of completing a learning session is too long. The average time spent perfecting a teaching session exceeds the time set in the learning plan, even though the learning material is pure. Respondents suggested that the use of this CAI model is only in the learning conditions outside the classroom, which sets a long period in completing one learning session so that there is an opportunity for students to take a break in the middle of learning activities when they feel bored. This finding is identical to Chaudhari's (2013) results that CAI is a new instructional strategy in effective teaching.

Second: Although the scenarios in the CAI algorithm design can motivate students to learn independently, some students are indicated to have difficulty following certain parts of the Database System material, especially those related to modeling material. Most of the students stated that they still needed instructors (assistants) to get a more in-depth explanation when they had difficulty understanding certain parts of the learning material. On this basis, the interactive CAI feature that is connected to the online resources system (internet) still needs further attention (in terms of design effectiveness) so that online resources systems can play a maximum role as a useful companion that offers assistance to students in the learning and training process, as in the findings of Longmuir (2014). Another solution expected by respondents is the interconnection of interactive CAI models based on Tutorials and Drill with a Web-based communication system that connects students with instructors interactively.

Third: The need to complete this CAI design with instructions for use and other adequate instructions relating to learning and practice. However, the idea underlying the emergence of this interactive CAI design is that students can use it as a medium of learning independently by minimizing direct assistance or instructor's involvement in learning sessions.

The availability of online-based technology now makes it possible to design CAI models based on Tutorials and Drill that allow students to more easily interact with instructors and diverse learning resources when students

have difficulty learning under self-control using interactive learning media.

5. Conclusions

The CAI model design based on a combination of Tutorial and Drill and Practice models much motivates students to learn under self-control, to improve mastery of competencies in the Database System. However, it is necessary to provide adequate guidance on the CAI application in its use. A more useful design model is also needed if the CAI application is intended to connect to systems that provide online teaching resources. This suggestion is to be the focus of further studies so that students can use CAI as an effective interactive learning media for learning.

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A Review on the Classification of Students' Interaction in Online Social Collaborative Problem-based Learning Environment: How Can We Enhance the Students' Online Interaction?

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract Purpose: The interaction between students during online learning is a growing concern of researchers today. Following the principle of educational psychology, a collaborative learning approach incorporates online learning activities to encourage active interaction and to cultivate problem-solving abilities via students' discussion. This study aims to identify the classification of students' interaction in the online social collaborative problem-based learning environment and the strategies to enhance online interaction. **Methodology:** The literature search was performed using the following electronic databases: Elsevier (ScienceDirect), Springer, Google Scholar, IEEE Xplore, SAGE, Emerald Insight, Taylor and Francis, ERIC and Scopus and Wiley Online Library for all papers published between 1989 and 2019. The initial search yielded 129 published articles. After screening and eligibility assessment, 28 articles were included in the review. **Main Findings:** The types of interaction among students included learner-learner, learner-instructor, learner-content, learner-interface, and learner-self. Less common types of interaction included learner-instruction, learner-environment, and learner-tool. Most researchers focused only on student-student interaction, especially studies between 2017 to 2019. As for improvement strategies, some papers focused on specific learner's interaction whereas others only outlined the general strategy without specifying the type of learner's interaction. **Applications:** Interaction is an important element of online learning. Activities involved in the active interaction among students such as sharing of ideas, discussion, negotiation, and opinion exchanges can improve their knowledge and thinking skills. As the student-centred approach in improving learning experience is gaining popularity, findings from this study

can be incorporated into today's education system to enhance students' interaction during online learning. **Novelty/Originality:** The results from this study will contribute to the existing literature on the types of interactions during online learning and strategies to improve students' interaction. We hope that this study enhances the understanding of the various stakeholders on the importance of effective interaction among students in the online learning environment towards the development of the thinking skills of our students.

Keywords Types of Learner Interaction, Online Learning, Social Learning, Collaborative, Problem-based Learning, Strategy in Interaction

1. Introduction

Many studies have proven that social interactions are a good approach for individual learning and collaborative learning, especially for higher education level (Vuopala, Hyvönen, & Järvelä, 2016). Students learn better when they are able to interact effectively with teachers, other students, and subject content whether they are in a traditional classroom setting or online learning environment. In recent years, with technological advancement, the interaction between students and technology has been highlighted in many platforms, especially in an online learning environment. The impact of interaction on learning has been extensively studied before and researchers have consistently found that interactions are a key element for successful learning experiences be it in a traditional classroom setting or online

learning environment (Mutalib, Halim, & Yahaya, 2016). Furthermore, students in the higher education level are able to improve their communication skills when they work together to solve their group assignment problems. This represents a valuable experience in their education journey (Vuopala et al., 2016). However, to achieve successful collaborative learning, all of those who are involved need to understand the role and application of effective interaction in the learning process (Vuopala et al., 2016).

Collaborative learning is vital in building students' confidence during the learning process. With a good level of self-confidence, students will be able to solve problems that they encounter during learning (Fung, 2014). Learning in groups enables students to learn and hear what others have to say, to seek out an explanation for misconception, to help and support others, and eventually to build a learning-friendly knowledge foundation. In this process, students will learn to talk and reason among themselves in a mature way and this subsequently translates into a relationship that is based on unity, trust, and confidence. For students to be able to learn successfully with one another in a group setting, all the above-mentioned factors must be given serious attention (Gillies, 2017). However, it is important to take note that group learning methods do not always achieve the intended learning objectives. This is especially true if there is also a lack of a collaborative approach among the group members to actively participate in the learning process (Matcha & Rambli, 2013). One of the commonly encountered disadvantages of collaborative learning is the unequal contribution of group members whereby some students tend to be "free riders" while others shoulder the responsibility to complete the group task (Baharudin & Jamalludin, 2014).

In view of this, many strategies have been put forth to design a healthy learning environment that promotes effective collaborative interaction. It has been postulated that a problem-based learning strategy would enable students to collaborate effectively (Savery & Duffy, 1995). This proposed approach included a learning strategy that would help the students to become more active in the learning process by motivating them to learn how to solve the real-world problem (Hulsman & van der Vloodt, 2015). Researchers who have studied the effects of collaboration on problem-solving have found that such collaboration improved students' abilities in advanced thinking when they are encouraged to discuss the problems put forth to them and to suggest potential solutions (Ku, Tseng, & Akarasriworn, 2013). With the increasing evidence showing that collaborative learning is an effective learning strategy that enhances student interaction and facilitates in-depth understanding through clarification processes, many educators have incorporated collaborative problem-solving activities for the benefits of their students, even in the online learning environments (Kwon, Song, Sari, & Khikmatillaeva, 2019). It is believed that the problem-based learning approach has the potential to

overcome issues pertaining to interaction within the boundaries of collaborative learning.

However, collaborative learning based on problem-solving is not always fully effective. It may be hindered by a limited exchange of resources and activities which cannot be resolved during the class (Conejo, Barros, Guzmán, & Garcia-Viñas, 2013). Interaction after class outside the classroom setting is vital in overcoming this limitation. Online social tools would be an ideal alternative as an online learning platform for the students to participate and contribute after class (Zulkifli, Abd Halim, & Yahaya, 2018). Although many researches had been conducted on topics related to students' interaction in the process of learning, there is a need for more extensive research to compare the different types of interaction. Interactions between students are very important during their learning journey in the educational institutes as good interaction can be a means for the students to achieve relevant goals, from both personal and institutional perspectives. Students' interaction is an important unit of analysis in the context of online learning. Thus, further research is warranted to explore these interactions across a variety of learning platforms and strategies in an online environment (Saadatmand, Uhlin, Hedberg, Åbjörnsson, & Kvarnström, 2017). In view of this, this study aims to identify the classification of students' interactions in an online collaborative learning setting and to determine how to improve students' interaction in the online problem-based learning environment.

2. Methodology

To fulfill the objectives of the research, we limited the search to studies relevant to students' interaction. The following inclusion criteria are applied: the study focused on the interaction during online learning education process and the article must contain the type of learners' interaction, and the study must be published in English language.

The literature search was performed using the following electronic databases: Elsevier (ScienceDirect), Springer, Google Scholar, IEEE Xplore, SAGE, Emerald Insight, Taylor and Francis, ERIC and Scopus and Wiley Online Library. We used the following terms in the search strategy: *interaction, interaction online learning, social interaction, online interactions, type of learner interaction, increasing interaction in social learning environment, learner computer interaction, collaborative interaction, and interaction in problem-based learning*. No restrictions on publication date were considered as we intended to evaluate the trend of the type of learner interaction over the years.

The initial search yielded 129 articles published between 1989 and 2019. After screening and eligibility assessment, 28 articles were included in the final review. Table 1 shows the database source, initial and final numbers of articles selected from the respective databases.

Table 1. Distribution of Papers by Online Database

Database	Candidates	Final Selection
Elsevier (ScienceDirect)	26	9
Springer	18	4
Google Scholar	17	3
IEEE Xplore	16	3
SAGE	11	2
Emerald insight	13	2
Taylor and Francis	9	2
ERIC	10	2
Scopus	5	1
Wiley Online Library	4	0
Total	129	28

3. Findings and Discussion: Type of Interaction in Online Social Learning

From the 28 reviewed articles, we are able to categorize the types of students' interaction reported by previous researchers. Moore (1989) was the first study to report on the 3 types of interactive relationships related to distance learning; namely interactions between learner-content, learner-instructor, and learner-learner. After that, Hillman, Willis, and Gunawardena (1994) suggested a fourth type of interaction; learner-interface. In a 1998 study, Soo and Bonk (1998) stated that self-regulation skills should be one of the most important learning objectives for online learning. Thus, learners should interact with themselves in order to conduct self-directed learning. Following that, Hirumi (2002) classified students' interaction into 4 types: learner-self, learner-human, learner-non human (content, interface, and environment), and learner-instruction. Based

on all the previous studies, Chou, Peng, and Chang (2010) then proposed the 5 types of learners' interaction in the setting of online learning, which included learner-learner, learner-instructor, learner-content, learner-interface, and learner-self. Similar to this 2010 study, Aqel (2013) and Prestridge (2014) focused on the same types of interactions except for the exclusion of learner-self interaction.

In a few other studies, Rhode (2009), Bernard et al. (2009) and Balaji and Chakrabarti (2010) focused on learner-learner, learner-instructor, and learner-content interactions. Similarly, the same interactions were the point of focus for another 3 studies published later on between 2011-2017 by Abrami, Bernard, Bures, Borokhovski, and Tamim (2011), Ping (2011), Mohammad, Sara, Zahra, and Mojtaba (2013) and Saadatmand et al. (2017). On top of these 3 above-mentioned interactions, Panchoo (2017) also focused an extra type of interactions, which was learner-tool interaction.

As for the remaining studies, the researchers mainly focus on 2 or a single type of students' interaction. For example, Meeuwisse, Severiens, and Born (2010) and Schallert et al. (2015) focused on the interaction between learner-learner and learner-instructor whereas Strickland and Xie (2012) focused on learner-learner interaction and learner-content interaction.

There were also a few papers which reported on only a single type of interaction. Zydney and Seo (2012); Jumaat and Tasir (2013) and Sarapin and Morris (2015) were the 3 published papers that focused only on learner-instructor interaction. Another 7 papers focused solely on learner-learner interaction, namely Kurucay and Inan (2017), Tawfik et al. (2017), Adraoui, Retbi, Idrissi, and Bennani (2017), Oyarzun, Stefaniak, Bol, and Morrison (2018), Annamalai (2018), Tawfik et al. (2018) and Hayashi (2019). The details of all the studies pertaining to online learning with their year of publication and type of learner interactions are shown in Table 2.

Table 2. Type of Learner Interaction in Online Social Learning

Author (Year)	Purpose of Research	*Type of Learner Interaction
Moore (1989)	To study the interaction for distance education	L-C L-I L-L
Hillman et al. (1994)	To introduce the concept of learner-interface interaction and to suggest methods that could increase the uptake of student knowledge in the electronic classroom based on instructional design	L-IF
Soo and Bonk (1998)	To explain what kind of interaction is considered important for online distance learning	L-L L-I L-C L-S
Hirumi (2002)	To posit a three-level framework for classifying e-learning interactions	L-S L-H L-NH L-I
Rhode (2009)	To analyze the dynamics of interaction within a self-paced online learning environment	L-L L-I L-C
Bernard et al. (2009)	To compare the various interaction methods with other types of instructional treatments in the setting of distance learning	L-L L-I L-C

Meeuwisse et al. (2010)	To study a model for describing the relationships between the extent to which learning environments are activating and students' interaction with teachers and peers, a sense of belonging, and the success of learning	L-L L-I
Balaji and Chakrabarti (2010)	To explore if online discussion forum is effective in aiding student learning	L-L L-I L-C
Chou et al. (2010)	To determine the interactions involved in course-management systems (CMSs)	L-L L-I L-C L-IF L-S
Abrami et al. (2011)	To discuss issues in the methodology of Bernard et al. (2009) and to determine how to improve the instructional design based on these results	L-L L-I L-C
Ping (2011)	To compare the types of student interaction on the online Learning Management System (LMS) between the undergraduate and postgraduate level	L-L L-I L-C
Strickland and Xie (2012)	To offer guidelines on how to utilize wikis to encourage collaboration and active learning within and between students in group work for higher educational settings	L-L L-C
Zydney and Seo (2012)	To analyze the impact of an online protocol on asynchronous discussions	L-I
Mohammad et al. (2013)	To introduce and analyze the interaction types, interaction, and interactive e-learning tools	L-L L-I L-C
Jumaat and Tasir (2013)	To identify the types of student online interaction through discussion on Facebook	L-I
Aqel (2013)	To examine the effect of different levels of interaction on instructional design learners and the instrument to collect data about students' instructional design course	L-L L-I L-C L-IF
Prestridge (2014)	To examine the learning outcomes of students' use of Twitter when used as a learning tool and to provide insight into how students and teachers interact in this environment	L-L L-I L-C L-IF
Sarapin and Morris (2015)	To investigate the use and gratification of instructors from the aspect of social interaction between instructor and on Facebook	L-I
Schallert et al. (2015)	To explore the role of a teacher and to investigate the influence of the presence of teachers in synchronous online discussions	L-L L-I
Kurucay and Inan (2017)	To determine how learner-learner interactions impact the perceived learning, achievement, and satisfaction among students in an online undergraduate course	L-L
Tawfik et al. (2017)	To assess the type and intensity of learner-learner interaction in an online Chemistry course provided by Coursera	L-L
Saadatmand et al. (2017)	To examine the interaction between learners and to explore their perceptions about the presence from the perspective of teaching, social, and cognitive in an open online course using the Community of Inquiry (CoI) framework	L-C L-I L-L
Adraoui et al. (2017)	To analyze the behavior of learners during virtual networking via an online discussion forum in Moodle using the social learning analytics (SLA) process	L-L
Panchoo (2017)	To compare the type of interactions desired by the learners and the actual learning activities	L-T L-C L-I L-L
Oyarzun et al. (2018)	To examine the designed and contextual interactions techniques in learner-to-learner interaction and to assess their effects on learner achievement, social presence, interaction quality, and learning satisfaction in online asynchronous courses	L-L
Annamalai (2018)	To investigate the patterns of interactions among ESL students during their online interactions to complete their narrative essays	L-L
Tawfik et al. (2018)	To study how learner-learner interaction can be influenced by the different types of cases	L-L
Hayashi (2019)	To explore the effectiveness of improving learners' interaction using pedagogical conversational agents (PCAs) in a learner-learner collaborative learning activity	L-L

* L-C: Learner-Content, L-I: Learner-Instructor, L-L: Learner-Learner, L-T: Learner-Tools, L-S: Learner-Self, L-H: Learner-Human, L-NH: Learner-Non-human (Content, Interface, And Environment), L-I: Learner-Instruction

Among the different types of students' interaction outlined in all the papers in Table 2, it is worth mentioning the paper of Chou, Peng, and Chang in 2010 which highlighted the 5 types of learners' interactions which were most relevant to the latest shift of learning environment from a traditional classroom setting to online environment. These 5 interactions were considered to be a good representation of all types of learners and provided comprehensive information with regard to interactions that take place on the online social learning platform. This sentiment was echoed by a meta-analysis about online learning interactions by Mutalib et al. (2016) and another paper published by Topal (2016) in which the level of satisfaction and readiness for examination among university students learning via E-courses were explored. We attempt to further describe the 5 types of learners' interactions in Chou et al. (2010) as below, in which learner refers to students and instructor refers to lecturer or teacher.

- a. **Learner-learner interaction:** The interaction that takes place between individual students or when the students are assigned to work in a small group. Communication tools must be made available for students to be able to share and exchange ideas with one another.
- b. **Learner-instructor interaction:** This interaction emphasizes the dialogue or conversation between the learners and instructors. The system must be able to provide an effective communication channel for the purpose of achieving effective interaction.
- c. **Learner-content interaction:** This refers to how the students interact with the subject they are learning or studying. This is necessary in order for them to construct meaning to the study topics and to relate the topics to personal knowledge so that they can apply it for problem-solving. To achieve this, students must be given the right means and tools to be able to interact with all the materials that are available in an online learning environment.
- d. **Learner-interface interaction:** The interface of the online learning tools must be user-friendly so that the students are able to easily access and control the online learning materials.
- e. **Learner-self interaction:** At the end of the learning, students must be able to reflect on the online learning content and process. A new and better understanding derived this interaction can improve the students'

ability to pursue their learning objectives and improve their learning progress.

Table 3 shows the number of papers by year of publication. The earliest article identified during the literature search was published in 1989. It is worth highlighting that the majority of papers from 2017 until 2019 focused only on learner-learner interaction.

Table 3. Distribution of Papers by Years

Year	Number of Papers	Year	Number of Papers
1989	1	1994	1
1998	1	2002	1
2009	2	2010	3
2011	2	2012	2
2013	3	2014	1
2015	2	2017	5
2018	3	2019	1
Total	28		

Table 4 shows the numbers of paper by the type of learners' interactions. The majority of the papers focused more than a single type of learner interaction. Among the different types of interaction, the most commonly reported interactions are learner-learner interaction (24 papers), followed by learner-instructor (19 papers), learner-content (15 papers), learner-interface (5 papers), and 3 papers for learner-self and other types of learner interaction (learner-instruction, learner-environment, and learner-tool) respectively.

Table 4. Distribution of Types of Learner Interactions

Type of Interaction	Number of Papers
Learner-Learner (L-L)	24
Learner-Instructor (L-I)	19
Learner-Content (L-C)	15
Learner-Interface (L-IF)	5
Learner-Self (L-S)	3
Others (Instruction, Environment, Tool)	3

Table 5 shows the type of interactions and strategies to enhance students' interaction during online learning. However, not all the 28 papers discussed the strategies to enhance interaction. Some papers only focused on specific types of learners' interaction whereas others only provided the general strategy without specifying the type of learners' interaction.

Table 5. Type of Interactions and Strategy to Enhance Interaction

Type of Interaction	Strategy to Enhance Interaction
Learner-Learner (L-L)	<p>Chou et al. (2010) - Utilizing social tools to improve student interaction</p> <p>Ping (2011) - Tools must be able to give instant feedback to stimulate and enhance the learning process</p> <p>Mohammad et al. (2013) - The application of video conferencing with E-mail messages</p> <p>Tawfik et al. (2017) - Adaptation of a comprehensive Learning Management System, for example, Massive Open Online Course (MOOC)</p> <p>Adraoui et al. (2017) - Learning Management System: Moodle</p> <p>Oyarzun et al. (2018) - Role-based scenarios; scaffolding by establishing rules and procedures of interaction; monitor and personalize interactions by providing timely and meaningful feedback from teachers and peers</p> <p>Annamalai (2018) - Social media: Facebook</p> <p>Tawfik et al. (2018) - Learning Management System: Blackboard - Problem based learning</p> <p>Hayashi (2019) - Pedagogical conversational agents (PCAs)</p>
Learner-Instructor (L-I)	<p>Moore (1989) - Provide support and encouragement</p> <p>Balaji and Chakrabarti (2010) - Role of the instructor in facilitating the discussion: multiple media of instructions - Many online activities such as web browsing, reading discussions and reading responses - Constant interaction and immediate feedback: detailed instructions provided to carry out activities, regular feedback from instructors - Assessment in the online environment - Opportunities for students to share their thoughts with each other</p> <p>Chou et al. (2010) - Synchronous communication - Assignment handling</p> <p>Ping (2011) - Tools must be able to give instant feedback to stimulate and enhance the learning process</p> <p>Zydney and Seo (2012) - A clear definition of the guidelines and expectations in terms of contributions from the students during learning - Selection of the types of teaching activities, for example, whether the instructor should give an initial prompt or direct question during the discussion - Instructor-facilitated discussions</p> <p>Mohammad et al. (2013) - Video conferencing with e-mails</p> <p>Jumaat and Tasir (2013); Sarapin and Morris (2015) - Social media: Facebook</p>

<p>Learner-Content (L-C)</p>	<p>Chou et al. (2010)</p> <ul style="list-style-type: none"> - Essential connections to link to other educational systems - Essential connections to link to related learning materials - Learners' contribution to learning materials <p>Ping (2011)</p> <ul style="list-style-type: none"> - Online quizzes - To explore the external web links provided - To make available various types of web-based resources and functions to enhance interactivity capabilities and to increase feedback on resources - Good web-based content
<p>Learner-Interface (L-IF)</p>	<p>Hillman et al. (1994)</p> <ul style="list-style-type: none"> - Understand the working procedures with the interface - Incorporation of activities that teach the students to become familiar with the interface, for example, rotation between the students to be responsible for interacting with the media, and project assignment that involves technology application for the purpose of student interaction. <p>Chou et al. (2010)</p> <ul style="list-style-type: none"> - Fixed-frame (menu) design - Language choice - Individualized web-browser design - Sitemap - Keyword search - System announcement - System message - User guide - Frequently asked questions (FAQs)
<p>Learner-Self (L-S)</p>	<p>Chou et al. (2010)</p> <ul style="list-style-type: none"> - Diary and reflective journal - Note taking - Electronic portfolio - Calendar & schedule reminder - Task list - Online quiz for self-evaluation
<p>Others (Instruction, Environment, Tool)</p>	<p>Not stated</p>
<p>General</p>	<p>Meeuwisse et al. (2010)</p> <ul style="list-style-type: none"> - A healthy learning environment and the cultivation of a sense of belonging among the learners <p>Abrami et al. (2011)</p> <ul style="list-style-type: none"> - Instructional designers need to ensure the overall design objective is user-friendly and easy to use for learners and instructors. - Students should be given more guidance as to the reason, the time, and the way to use the tool. - Training must be offered to show users how to use the tools properly and wisely - Learning tools and strategies must be incorporated as an important feature of the course to make the course more effective. <p>Ping (2011)</p> <ul style="list-style-type: none"> - Learning Management System (LMS) <p>Strickland and Xie (2012)</p> <ul style="list-style-type: none"> - Instructors must aim for a purposeful engagement with learners. This can be achieved via communication, cooperation, collaboration, active learning, feedback, and respect for differences <p>Aqel (2013)</p> <ul style="list-style-type: none"> - Learning Management System: Moodle <p>Prestridge (2014)</p> <ul style="list-style-type: none"> - Social media: Twitter <p>Saadatmand et al. (2017)</p> <ul style="list-style-type: none"> - Learning Management System: Massive Open Online Course (MOOC) - Problem Based Learning

The main strategies recommended by most of the past studies to improve learner-learner interaction revolved around the application of social tools such as video conferencing, e-mail, and Facebook. These tools facilitated constant correspondence between students during group work and enabled the provision of immediate feedback to the learners. Another strategy was to apply Learning Management System such as Massive Open Online Course (MOOC) and Moodle and Blackboard. These systems have an in-built set of rules and procedures about the interactions, which allow the monitoring and even customization of the interactions based on the needs of the users. They are also an effective platform for the provision of timely and meaningful feedback from educators and peers. Apart from that, incorporation of problem-based learning strategy and pedagogical conversational agents (PCAs) can also stimulate the learning process.

For learner-instructor interaction, the main strategy involved the provision of support and encouragement by the educators. They can prepare various online activities such as web browsing, reading discussions, field observations, and reading responses. They should also strive to conduct ongoing interaction with the learners in terms of providing the learners with detailed instructions to complete activities. Regular feedback from instructors would increase communication among students and boost greater participation from students. By providing ample opportunities for students to share their thoughts with each other and with teachers via online discussion forum, video conferencing, e-mail messages, or social media such as Facebook, the students can receive immediate feedback and this will stimulate their learning process. However, it is important to establish clear guidelines in terms of expectations towards student contributions, especially for group assignment. Instructors should also discuss with the learners to reach a common understanding in terms of selection of instructional activities, for example, whether the instructor should give an initial prompt or direct question during the discussion. This is essential to encourage instructor-facilitated discussions.

With regard to learner-content interaction, the links to relevant materials were highlighted as the main strategy in enhancing interaction. There should be links made available to other educational systems, learning materials, and multimedia presentation. Students can be given online quizzes after they explored the external web links. Other strategies to consider included the use of online discussion forum, proper selection of web-based resources based on the content, functions, interactivity, and feedback capability of the resources. The web-based content must also be easily accessible, flexible, highly interactive, and easy to navigate. The motivational value and effectiveness of the online learning environment must be preserved to fulfill the needs of students.

Apart from the content, strategies to improve the learner-interface interaction are also a point of interest for

the researchers. One of the main strategies proposed in the selected articles was the development of working procedures with the interface that can be easily understood in order to facilitate the communication and active involvement of students. Teaching activities that help students to familiarize themselves with the interface and to accept the technology and content of the instruction should also be implemented. The teaching activities included game-playing, rotation of responsibility to interact with the media among the learners, project assignment that involved the use of technology to interact with others. Apart from that, it is also highly recommended for the interface to incorporate suitable fixed-frame (menu) design, language choice, individualized web-browser design, sitemap, keyword search, system announcement, system message, user guide, and frequently asked questions (FAQ) section about the system.

For learner-self interaction, the strategies suggested included the use of a diary or reflective journal, note-taking, electronic portfolio, task lists, and schedule reminder on the calendar. Online quizzes can also be used for the purpose of self-evaluation. No specific strategies were mentioned by all the 28 papers for the improvement of other types of interaction such as learner-instruction, learner-environment, and learner-tool.

Besides focusing on improvement strategies for specific types of learner interaction, some of the papers also touched on the general strategies that can be considered. These strategies included the cultivation of a healthy learning environment and a sense of belonging. To achieve that, instructional designers must ensure that the overall design objective is user-friendly and easy to use for learners and instructors. Apart from that, students should be given more guidance as to the reason, the time, and the way to use the tool. Very often, practice makes perfect. Thus, potential users must undergo training so that they can learn how to use the tool in a proper way. It is also important to incorporate cognitive tools and strategies as an important feature of the course to make the course more effective. This can be achieved by using learning management systems such as Moodle or MOOC. Wiki tool is also helpful in the designing of a purposeful engagement that emphasizes effective communication and collaboration to stimulate active learning via constant feedback and acceptance for differences in opinions.

4. Conclusions

In conclusion, this review identified 5 relevant types of learner interactions that are important in enhancing students' learning performance, namely learner-learner, learner-instructor, learner-content, learner-interface, and learner-self interaction. Comparisons were made between the types of students' interactions and strategies involved in each type of interaction. We also outlined the overall

strategies to improve those interactions. Apart from a centralized approach, interactions at the individual level should also be encouraged among the students. Instructors should facilitate students' interactions with content, interface, self, and with other students. We believe that findings from this review will contribute to the existing literature on types of interactions and strategies for increasing students' interaction during learning.

Acknowledgements

The authors would like to thank the Universiti Teknologi Malaysia (UTM) and Ministry of Education (MoE) Malaysia for their support in making this project possible. This work was supported by the Research University Grant [Vote No: Q.J130000.2531.16H55] initiated by UTM and MoE.

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Identifying Instruments to Measure Programme Educational Objectives (PEO) Achievement in Malaysia

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract Outcome Based Education (OBE) is required to be implemented in all academic programmes in Malaysia in order to fulfil the standards specified by the Malaysian Qualification Agency (MQA). One part of the OBE that needs to be measured is Programme Educational Objectives (PEOs). PEOs are broad statements that describe the expected achievement of graduates within three to five years of graduation. All institutions in Malaysia need to measure the PEOs. However, the PEOs of community colleges are not measured yet after five years of programme's implementation. Therefore, this paper systematically reviews the current instruments applied by community colleges in Malaysia to evaluate the programmes and identify the problems in the instruments. This survey study adopted triangulation approach where the data were collected from semi-structured interviews and document analysis. Semi-structured interviews were conducted with five officials from different divisions in the Department of Polytechnic and Community Colleges Education (JPPKK). These samples were purposively selected because their scope of the task was directly involved with the process of development and evaluation of the programme outcomes. Analysis of PEOs was also conducted to compare the PEOs of community college with eight local universities which are UKM, USM, UPM, UTM, UTHM, UTaM, UniMAP and UiTM. The analysis is based on PEOs of engineering or technology program from each institution. The results of this study identified four problems from the community college's instruments which are: (1) no specific measurement of PEOs, (2) unsuitable timeframe of data collection, (3) respondents' feedback is distracted by too many questions, and (4) lack of stakeholders' point of view. These results indicate that community colleges need the right instrument to measure the achievement of PEOs. Therefore, further research is suggested to study the instrument to measure the achievement of community college's PEOs.

Keywords Programme Educational Objectives, Community College, Instrument

1. Introduction

In a rapidly developing country, higher education providers, including technical and vocational education and training (TVET) institutions, play a crucial role in driving the engine of change to increase national productivity in economic and social status. Upgrading the teaching and presentation content in vocational training will consequently contribute to the development of human capital thus leading to producing skilled workforce and Malaysia having the upper hand to compete economically at a global stage. Through continuous upgrades and skills taught in the education system, technical colleges become a significant contributor to the production of creative and innovative learners who are able to contribute more effectively to the national economic development and prosperity (Lam & Hassan, 2018).

To contribute effectively, TVET graduates, especially from polytechnics and community colleges, need to be more competent and skilled. The Department of Polytechnic and Community College Education (JPPKK) is committed to ensure that the programmes offered meet the standards set so that the graduates produced have relevant skills that fit the employer's wishes. This aforementioned department aspires to fulfil the aim to be the leading TVET institutions that provide quality education and training required by industry and the community in the region by the year 2025.

Early in 2009, all academic programmes offered by the public and private higher learning institutions in Malaysia were required to fulfill the standards specified by the

Malaysian Qualification Agency (MQA) as directed by the Ministry of Education to ensure that the programme is accredited. Community colleges are one of the public higher institutions that are included to be accredited by the MQA. In addition to that, all programmes that apply for accreditation need to implement the Outcome-Based Education (OBE) in their respective curriculum design and delivery.

Each Higher Education Provider (HEP) is also advised to implement various forms of assessment to ensure the quality of programmes offered complies with the requirements of MQA and its stakeholders. One of the elements that need to be measured is the Programme Educational Objectives (PEO). PEOs are broad statements that describe the expected achievement of graduates within three to five years of graduation. All institutions in Malaysia need to measure the PEOs. However, the PEOs of community colleges are not measured yet after five years of programme's implementation.

Due to the lack of the PEOs evaluation, this paper aims to identify issues related to the current instrument used by community colleges to assess and evaluate the achievement of the PEOs. The objectives of the research were to:

- a. identify current instrument adopted by the JPPKK to measure PEOs
- b. identify issues with the current instrument
- c. determine suggestions to improve the current instrument.

2. Literature Review

The quality education system requires all academic programmes offered by the Higher Education Provider (HEP) to adopt the Outcome-Based Education (OBE) concept that is in line with the aspirations of the Ministry of Education Malaysia and the Malaysian Qualifications Agency (MQA). The OBE curriculum design starts with the aim of the programme which outlines the philosophy, rationale, and purpose of the programme. The design details on the outcomes of learning that students need to achieve when engaging in the academic programmes. These intended learning outcomes ensure the availability of graduates (MQA, 2014b). These learning outcomes also form the basis of the formation of five clusters within the Malaysian Qualifications Framework (2017) namely:

2.1. Knowledge and Understanding

Knowledge and understanding refers to a systematic understanding of facts, ideas, information, principles, concepts, theories, technical knowledge, regulations, numeracy, practical skills, tools to use, processes and systems. Knowledge and understanding enables the

learners to relate their prior knowledge on the course learning with their line of work. Knowledge provides the basis for applications of the learning outcomes.

2.2. Cognitive Skills

Cognitive skills are skills related to thinking or intellectual capabilities to apply learned knowledge and skills. The capacity to develop levels of intellectual skills progressively begins from understanding, critical or creative thinking, assessment, and applying, analyzing, problem-solving, as well as synthesizing to create new ideas, solutions, strategies or new practices. Such intellectual skills enable learners to search and comprehend new information from different fields of knowledge and practices.

2.3. Functional Work Skills with a Focus On:

a) Practical skills

These are generally work skills and operational skills that are applicable in familiar employment environment such as planning, organizational skills, selection of tools, material, technology methods, and procedures, while in the theoretical context, the practical skills include study skills and preparations, undertaking procedures, scientific skills, designs, research and so forth. They also include specialized skills which are set by a specific subject, discipline, technical or occupation-related work skills, and professional practice which helps with the enhancement of professional competence. Practical skills should include safe and sustainable practices.

b) Interpersonal skills

Interpersonal skills refer to a range of skills which, amongst others, include interactive communications, relationships and collaborative skills in managing relationships in teams and within the organizations, networking with people of different cultures, as well as social skills or etiquette.

c) Communication skills

Communication skills generally refer to the ability to communicate or convey information, ideas, or reports cogently and professionally with the use of appropriate language. The communication skills must be valid and in appropriate forms, in various medium, to a range of audiences and different situations. The ability to communicate in more than one languages is encouraged.

d) Digital skills

Digital skills generally refer to the ability to use information or digital technologies to support work and studies. The skills include sourcing and storing information, processing data, using applications for problem-solving

and communication, as well as practicing ethics in applying digital skills.

e) Numerical skills

These are the quantitative skills that require learners to acquire higher levels of numerical abilities. It is acknowledged as an essential skill to survive and remain relevant in the study, work, and daily life. Within the MQF levels, this learning outcome may not be specifically mentioned for every level but it is expected that numerical skills are required as the outcome which ought to be indicated for every specific programme.

f) Leadership, autonomy, and responsibility

This cluster of skills refers to an individual's ability to build relationships and work with teams made up of peers or in managerial capacities with varying degrees of autonomy, to make decisions or set goals at organizational, unit, or team levels, to take responsibilities and provide accountability, to be confident, knowledgeable, articulate, honest, professional, concerned, resilient, a risk taker and possess other intrapersonal skills including working in, and leading teams.

2.4. Personal Skills and Entrepreneurship

Personal skills are life skills that learners are expected to use in daily life. They are generally portrayed through enthusiasm for independent learning and intellectual and self-development. Personal skills are portrayed through demonstration of confidence, self-control, social skills and proper etiquette, and commitment to professionalism in the workplace. They also include the capability to plan for career development or higher education. Aspects of character such as honesty, punctuality, time management, and keeping to and maintaining deadlines that are important in a work environment are also essential personal skills.

Entrepreneurial skills require relevant knowledge, skills, and expertise in critical areas of an enterprise. Outstanding personal qualities include creativity, grit, and drive. The learning outcomes describe the incremental development of these skills. The drive to be an entrepreneur is not only set as personal skills but entrepreneurship also requires the requisite of relevant knowledge, cognitive and functional skills.

2.5. Ethics and Professionalism

Ethics and values are essential in personal, organizational, societal or community, and global settings as they guide personal actions and interactions at work and within the community at large. Awareness or understanding and respect of ethical, social, and cultural differences and issues are critical in the exercise of

professional skills and responsibilities, integrity, professional conduct (professionalism), and standards of conduct such as upholding regulations, laws, and codes of good practices or code of professional conduct. A sensitive approach in dealing with other cultures adds value to this learning domain.

Hence, the implementation of OBE requires every programme to have the Programme Educational Objectives (PEOs) which include the five clusters mentioned above. PEOs are a statement that describes the achievement of graduates within three to five years of graduation by measuring the outcome of the education that has been in the course of their study. Also, PEOs represent the judgment of the relevance and success of a programme. PEOs are provided in conjunction with the involvement of stakeholders in the programmes offered so the requirements and standard set are met.

Besides that, PEOs have a direct link with learning outcomes and curriculum design. Curriculum and learning outcomes prepare students to achieve PEOs (MQA, 2014b). As a result, if students do not achieve the PEOs after they have graduated, there are probably issues with the curriculum and learning outcomes of the program (Abbadeni, Ghoneim, & AlGhamdi, 2013). Therefore, curriculum developers must carefully identify PEOs and make sure the curriculum and the outcomes prepare students for the achievements of the aforementioned PEOs.

However, PEOs' achievement for community college programs has never been measured after five years of the program's implementation. In the context of a dynamic environment, PEOs need to be monitored and systematically reviewed to ensure that they are aligned with the strategic directions, changing needs, and education's good practice. Program monitoring and review is a standard to be followed in Area 7 based on the Code of Practices Program Accreditation (COPPA) (MQA, 2014a). This standard covers the process of monitoring, reviewing and evaluating institutional structures and processes (administrative structures, leadership and governance, planning and review mechanisms), curriculum components (syllabus, teaching methods, learning outcomes), as well as graduates' progress, performance, and employability.

The purpose of monitoring and reviewing programme is to identify and evaluate whether the institution has reached the strategic plan targets and whether the aforementioned plan is still relevant and suitable (MQA, 2014a). Curry (2018) defined monitoring as a continuous function that provides intervention with early indications of progress in the results achieved. Programme monitoring identifies the issues and shortcomings in maintaining academic standards so that necessary action can be taken to improve the academic standards. Program monitoring improves the quality of students' experience by providing continuous review, identifying areas for improvement, and taking appropriate and timely actions (MQA, 2014a).

At this stage, the institution needs to measure and

analyse the achievement of the predefined targets. Abdullah et al. (2008) stated that the absence of a PEO measurement mechanism will affect the success of an accredited program by MQA. This is reinforced by the statement of the full accreditation compliance requirements set out on the community college program where the program should have a mechanism to measure the Program Educational Objectives (PEO), Program Learning Outcomes (PLO), and Course Learning Outcomes (CLO). Failure of the institution to comply with this requirement may result in the withdrawal of accreditation certificate (MQA, 2016). Unaccredited programs will affect the graduates when they want to pursue studies or apply for jobs in the public sector.

Therefore, in order to meet the accreditation requirements, various forms of assessment need to be undertaken to determine the quality of the program implemented in compliance with the requirements of the Malaysian Qualifications Agency (MQA) and various stakeholders. Assessment, in general, serves the purposes to (MQA, 2014b):

- a. promote learning;
- b. measure performance, by awarding grades which indicate whether and how well a particular student has attained the stated learning outcomes;
- c. determine whether a particular student is sufficiently well prepared in a subject area to proceed to the next level of instruction;
- d. give feedback to students which indicates levels of attainment and diagnose misunderstandings and learning difficulties; and
- e. give feedback to teaching staff to identify and diagnose ineffective teaching methods or techniques.

To comply with the demand for assessment that leads to continuous improvement, institutions are advised to create a systematic process that identifies specific learning outcomes, developmental objectives, and ways to measure the student's achievement (Merhout, Benamati, Rajkumar, Anderson, & Marado, 2008). Abd Rahman, Ab-Rahman, and Mohd Yusoff (2016) suggested that two methods of assessment can be applied to measure the achievement of graduates, namely, direct and indirect measurement methods. Direct measurement is the tool used to assess the achievement of alumni, usually via a survey. This will provide evidence that are collected and analyzed to demonstrate that actual learning has taken place. The survey is helpful to inform students, teachers, and other stakeholders of the depth, breadth, and performance quality of how well that students have gained regarding relevant knowledge, understanding, skills, habits of minds, and ways of responding to people and situations (MQA, 2014b).

Meanwhile, the indirect method can be implemented by mapping the attainment of PLO with the PEO. Indirect assessment is essential in predicting PEOs' attainment and

therefore justifying the assumption that the students to be already competent upon completion of the programme (Abd Rahman et al., 2016). The PEOs can be assessed by using these instruments or methods which are alumni surveys, alumni interviews, employer surveys, employer interviews, job offers (starting salaries), admission to graduate school, parents survey, academic staff perception survey, and reports with industrial advisory panel (MQA, 2014b & Mamat, Rasul, & Mustapha, 2014). If any change results from the assessment process, PEO needs to be revised and updated. Abbadeni et al. (2013) stated that PEO represents the success of a programme where the failure of graduates to reach the PEO indicates that there is an issue with the curriculum and the programme implemented needs to be reviewed. Competitive graduates in the job market often depend on a robust curriculum of the programmes where structuring a comprehensive curriculum is vital in the academic programme (K. Ahmad, Zainal, Idris, & Rahmat, 2011). The ability of graduates to achieve programme objectives is a measure that the programmes learned at the institution are of high quality and relevant to industry needs (Ismail, Md Shaari, Faisal, Husain, & Raja Mohamed, 2014).

To ensure that the graduates meet the employability market and industry demands, the quality of graduates must be aligned with the programme educational objectives (PEOs) as well as gain the information from graduate's work life (Ibrahim, 2014). Low quality of graduates becomes a factor in the unemployment issue (Nooriah Yusof & Jamaluddin, 2015). Therefore, the quality of students' learning including employability capabilities needs to be assessed. This attention to feedback from those who employ or educate graduates, and from graduates themselves, is an important element of efforts to improve education in higher education provider (HEP). This assessment is a complex endeavour and it needs to be carefully done as higher education providers will bear the implications of ineffective assessment (Rowe & Zegwaard, 2017).

Despite all the instruments used to assess and evaluate programmes offered in the public and private universities, PEOs' achievement for community colleges is still unknown due to the PEO assessment that is part of the Continuous Quality Improvement (CQI) cycle being incomplete. At the institutional level, CQI is a systematic and structured mechanism that enables the HEP to achieve its vision, mission, and educational goals (MQA, 2014a). CQI practice is important to measure the achievement of vision, mission, educational goals, and learning outcomes. The goal is to keep the current PEOs by adopting a process which identifies the needs of the programme's various constituencies, critically assesses the attainment of graduates, and reassesses and updates the objectives. This is a cyclical process. Although elements of this process are continuous and will vary among programmes, each institution has the responsibility for ensuring that every

programme goes through a documented cycle of activity such as PEO that is evaluated at least every three years to resolve potential issues while fulfilling as many needs and as practical as possible (Mamat et al., 2014). The MQA accreditation's report for community colleges stated that one of the requirements for accreditation is a mechanism to measure Programme Educational Objectives (PEOs), Learning Outcome Programme (PLO) and Course Learning Outcomes (CLO) to meet the CQI process. Failure to practice CQI will affect the quality of the graduates produced that do not meet the competence characteristics required by potential employers. Thus, to consider the likes of graduates being seen incompetent and unfit to work in the fields they studied in, the PEOs and curriculum content need to be enhanced and aligned with the needs of future potential employers. Graduates of community colleges will have better prospects of marketability.

3. Methodology

To identify issues related to the current instrument used by community colleges to assess and evaluate the achievement of the PEOs, this research adopted a triangulation approach to determine the validity of data through cross verification from several sources. Triangulation is an attempt to check the validity of the data or the information obtained by researchers from different angles through reducing bias in the data collection and analysis process (Yahaya et al. 2017). This survey study adopted qualitative approach where the data were collected from semi-structured interviews to identify the problems in the instruments and document analysis to support, complement, and strengthen the findings from interview sessions.

Semi-structured interviews were conducted with five officials from different divisions in the Department of Polytechnic and Community Colleges Education (JPPKK). They represented: (1) one official of quality assurance unit, (2) one official of graduate employability unit, (3) one official of curriculum unit, and (4) two officials of programme planning unit. In general, their working experience at JPPKK ranges from 1 to 7 years. These samples were purposively selected because their scope of

the task was directly involved with the process of development and evaluation of the programme outcomes. The samples of this study were asked six open-ended questions in the semi-structured interview. The questions are on: (1) the current instruments used to measure the success of the programme outcomes, (2) methods to utilise the instruments, (3) issues with the utilisation of the instruments, (4) suggestions to assess PEO, (5) the needs for PEO to be assessed and evaluated with a specific instrument, and (6) issues that may arise if PEO is not assessed and evaluated.

In order to further validate the findings of the data, this research also included document analysis on the evaluation and assessment of PEOs that have already been developed and implemented in universities in Malaysia. Information obtained from the documents is used to support and complement evidence while verifying the information obtained from interviews and observation (Creswell, 2012). There were eight instruments of PEOs achievement that were analysed based on four research universities (UKM, USM, UPM, and UTM), four Malaysian Technical University Network (UTHM, UTeM and UNIMAP), and one comprehensive university (UiTM). These universities were chosen because they provide engineering or technology programmes. Besides that, the universities also shared the instruments used to measure the PEOs. The instruments used by these universities are employer surveys and alumni surveys. These instruments of JPPKK and universities were compared to identify if there are any similarities or differences between them. The analysis was done using NVivo 12 Plus.

4. Results and Discussion

In order to identify the instruments and issues related to them, analysis of interview session, documents, and PEOs was done to identify the instruments and issues related to them being utilised in the universities abovementioned.

4.1. Interview Session Analysis

Based on the interviews, there were four instruments used by the JPPKK to measure the outcome of the programme as summarized in Table 1 below.

Table1. Instruments used by JPPKK

Institution	Instrument	Usability	Methods of implementation
Community College & Polytechnic	Graduate Employability Survey	1) Identify the graduates' status either working, unemployed, or furthering studies. 2) Identify the graduates' learning experience at community college/polytechnic 3) Identify the effectiveness of the programme	The survey has to be answered online via http://graduan.moe.gov.my/v/ . The system opened 30 days before the convocation ceremony.
Community College & Polytechnic	Self-review Audit (Evaluation Instrument of COPPA)	An internal audit to identify any strengths and weaknesses of the programme	Download the Excel-based instrument from MQA portal and fill in the form by programme and institution. The instrument will view the result summary of programme status. The result will be sent to MQA for evaluation.
Polytechnic	Programme Alignment	Review program offers based on student enrolment, student applications, graduate employability in field, and the median range of graduate's salary.	Fill up the Excel-based instrument. The data are gathered from various divisions in JPPKK.
Polytechnic	Employer Survey	Identify employer's needs and perception about graduates	Distribute the survey to employers during industrial visits.

Five themes were identified regarding the issues with the instruments and they are explained as below:

- (1) The Graduate Employability (GE) survey is too general and it is not specified for each respective programme
- (2) The time duration of data collection is not suitable (too short or too long?)
- (3) Too many items in survey form distract the respondent's response
- (4) Lack of stakeholder's point of view
- (5) Internal audit is too broad and not specific to measure PEO

Based on the data collected and analysed, while the Graduate Employability (GE) survey is effective in assessing and evaluating the programme outcomes, the items in the survey are too general, are not specified for each area, and do not reflect the primary objective for each, specific programme. This problem was raised by one of the interviewees who said:

"The questions are broad. No specific question to the specific programme area."

[Interviewee 1 | Theme: Issue]

To ensure data collected are valid, the objectives set for this survey should be specified by cooperating with the survey's relevant users and its stakeholders (Brancato et al., 2006). In assessing PEOs, the set of items asked must include the important criteria in the PEOs (Zulkifley, Misran, Abd. Aziz, & Hussain, 2008). A thorough and accurate assessment ensures that the theories and application of knowledge identified will truly direct students towards achieving the intended outcomes (Yarbrough, Donald, Shulha, Hopson, & Caruthers, 2010).

The data collected also showed that the current GE survey is inadequate in the sense that it assesses and

evaluates the outcome six months after graduates complete their studies; this contradicts the statement made by the MQA that PEOs must be measured after three to five years of graduation (MQA, 2014b). One of the interviewees was worried that the result might not be precise because of the time allocated for data collection.

"We collected the graduates' data before convocation day. Some of them may just work for a few months so their work experience is still not enough to be evaluated."

[Interviewee 1 | Theme: Issue]

Different time allocation for data collection will give different results depending on the respondent's experience (Danielle & William, 2013). Therefore, utilising GE to assess and evaluate PEOs may be irrelevant and obsolete due to the two aforementioned issues discussed. Besides GE survey, another instrument which is employer survey is also distributed during industrial visits by industrial training officials. The interviewees shared their views that there were cases in which employers did the assessment based on the industrial trainees instead of their real employees. This reflects on the issue of the suitable time for data collection.

"Usually the employer survey was distributed during industrial visits. The employer may wrongly assess the industrial trainees instead of the real employees. In my opinion, the employer survey should be distributed in time other than industrial visits."

[Interviewee 2 | Theme: Issue]

Interviewees also expressed their concerns during the interview sessions about the instruments. They were worried that there too many items in 18 pages of the GE survey and how those would affect the validity of data. One of the respondents shared:

“You know our students; they answer this survey only for the sake of attending their convocation. Some of them, not even read.”

[Interviewee 1 | Theme: Issue]

Another interviewee added:

“I am not sure if they read each item in the survey.”

[Interviewee 2 | Theme: Issue]

A research done by Khairuddin (2013) revealed that Malaysians in general and students particularly have poor reading habits as reading is perceived as displeasing, complicated, and many avoid it. Rolstad, Adler, and Ryden (2011) have identified one of the factors that affect the response burden is the length of the questionnaire and this burden is reflected in the response rate. The longer the questionnaire, the less likely potential participants will be motivated to volunteer for the study or to complete all the items (Worthington & Whittaker, 2016). Therefore, it is suggested that the total length of the survey should be as short as possible and it has to be directly related to the study's purpose.

Besides that, community colleges and polytechnics have conducted self-review audit, which is also known as an internal quality audit, in order to comply with the continuous quality improvement process. However, the audit is conducted internally by the institution without taking in views from its stakeholders. MQA has outlined guidelines for PEOs assessment to gather feedbacks from stakeholders such as alumni and employers (MQA, 2014b). The interviewees frequently cited that the self-review audit is too broad as it includes many general constructs which are: (1) programme delivery, (2) student assessment, (3) student support and services, (4) academic staff, (5) educational resources, (6) programme management (7) and monitoring as well as (8) continuous quality improvements. One of the interviewees said:

“The areas are broad. The audit focuses more on fulfilling the requirements of accreditation, not specifically to measure the PEO.”

[Interviewee 3 | Theme: Issue]

This response showed that the respondent disagreed that using the self-review audit to measure PEOs due to the

items in the self-review audit were not purposely to measure the PEOs. PEOs measurement should have been done via more suitable mechanisms such as advisory board meeting, focus group survey, alumni survey, and employer survey (Abbadeni et al., 2013).

Finally, JPPKK has also developed an Excel-based instrument to review programme outcomes in order to ensure they are aligned with the programmes offered. The review is based on student enrolment, students' applications, graduate employability in field, and the median range of graduate's salary. In the interview, the interviewees claimed that:

“We cannot align the programme as a result did not consider the view of industry players which is our main stakeholders.”

[Interviewee 4 & 5 | Theme: Issue]

This response showed that the stakeholders' view is very crucial. According to Abbadeni et al. (2013), industrial and societal demands play an important role in forming and building the programme outcomes. Institution has the responsibilities for meeting the needs, interests, and viewpoints of the stakeholders (Asiyai, 2014). Hence, feedback from experts in the industry is important as it keeps the curriculum up-to-date and relevant to the field (Norhafezah Yusof et al., 2018).

In summary, these findings show that specific instrument with suitable and convenient time for data collection should be considered as they will affect the objective of instrument implementation. Also, feedbacks from alumni, employers, and industries are critical in ensuring the sustainability of the programme. A suitable and specific instrument is needed to measure the PEOs.

4.2. Documents Analysis

Document analysis was also adopted as part of data collection and analysis of this study to identify the usability and effectiveness of various instruments utilised by different universities to measure PEOs. Each of the instruments utilised by these respective universities is compared with the current instrument utilised by JPPKK. The summary of the comparison is tabulated and presented in Table 2 below.

Table2. Comparison of JPPKK's instruments with universities

Institution	Instrument	Usability	When	Types of measurement		Number of Questions
				Direct	Indirect	
Community College & Polytechnic	Graduate Employability Survey	1) To identify the graduates' status: employed, unemployed or furthering studies.	6months after graduate		/	7 constructs with 170 items
		2) To identify the learning experience offered at an institution				
		3) To identify the effectiveness of programme				
Community College & Polytechnic	Self-review Audit (Evaluation Instrument of COPPA)	An internal audit is done to identify strengths or weaknesses of the programme	Within 3 years after full accreditation	/		7 areas with 96 standards
Polytechnic	Programme Alignment	To evaluate programmes offered based on student enrolment, student applications, graduate employability in field, and the median range of graduates' salary.	Not applicable yet	/		30 items
Polytechnic	Employer Survey	To identify employer's needs and perception about graduates	Every year		/	3 constructs with 24 items
UKM	Alumni Survey	Gathering responses to identify ways to produce better graduates in future	Every 3 to 5 years		/	3 constructs with 26 items
	Employer Survey				/	
USM	Alumni Survey	To measure the university's achievement in providing the necessary preparation for the graduates' careers	Every 3 to 5 years		/	2 constructs with 15 items
UPM	Alumni Survey	To identify the programme's achievement in providing career route for graduates	Every 3 to 5 years		/	3 constructs with 32 items
	Employer Survey	To evaluate the quality of graduates as employees in the organisation			/	4 constructs with 32 items
UTM	Alumni Survey	To evaluate the outcomes or achievements of graduates	3 years and above		/	3 constructs with 32 items
	Employer Survey	To inquire about employer's sense on how graduates are doing as employees in an organisation			/	2 constructs with 21 items
UTHM	Alumni Survey	To identify the programme's achievement in providing career route for graduates	Every 3 to 5 years		/	3 constructs with 20 items
	Employer Survey	To evaluate the quality of graduates as employees in the organisation			/	3 constructs with 27 items
UTEM	Alumni Survey	To identify the programme's achievement in providing career route for graduates	Every 3 to 5 years		/	3 constructs with 18 items
	Employer Survey	To evaluate the quality of graduates as employees in the organisation			/	
UNIMAP	Alumni Survey	To measure the achievement of PEOs in order to complete the CQI process	Every 3 to 5 years		/	3 constructs with 22 items
	Employer Survey	To ensure the PEOs are relevant			/	4 constructs with 13 items
UiTM	Alumni Survey	To identify the programme's achievement in providing career route for graduates	Every 3 to 5 years		/	3 constructs with 14 items
	Employer Survey	To evaluate the quality of graduates as employees in the organisation			/	3 construct with 26 items

Sources: The information was gathered from each university's website

Based on Table 2, all the universities use alumni survey and employer survey to measure their PEOs while community colleges and polytechnics use various outcome-based instruments but not specifically to measure PEOs. Several themes were identified and they are stated as below:

- (1) The items are not specific and tailored according to the programmes offered
- (2) There are too many items
- (3) The time allocated for data collection is unsuitable

The current instruments and survey utilised do not evaluate the programmes' achievement holistically as they are conducted by different divisions at JPPKK. Since each instrument aims to achieve different and respective objectives, the outcomes become too general. Survey works best with clear targets to gather the right information and important factors (Denscombe, 2010). Survey should be specific enough to cover in the areas researched (Mason, 2014). Therefore, a survey has to be specific to answer questions raised, solve problems posted or observed, assess needs and set goals, and determine whether or not the specific objectives set are met (Glasow, 2005).

MQA also suggested that evidence should be to attain the PEOs using indirect assessment tools like alumni survey, employer survey, stakeholder survey, alumni interviews, job offers, starting salaries, and admission to graduate programmes or professional qualification. According to Merhout et al. (2008), while indirect assessment provides information about students' perception of their level of learning and abilities related to the programme or course learning outcomes direct assessment should also be included. Using only one method to gather information about the programme will only reflect a part of students' achievement. In addition, it is best to utilise at least two assessment tools to reduce bias and validate inferences obtained from the data collected (MQA, 2014b & Merhout, et al., 2008).

Most of the universities' instruments consist of three to four constructs with a total number of at most 32 items whereas the Graduate Employability (GE) survey that is

currently used by the JPPKK has 170 items. Glasow (2005) emphasized that the length of a questionnaire should not be onerous and the questions should not double negatives and long questions as they may lead to respondents losing interest in answering. Rolstad et al. (2011) highlighted their concern about respondents' burden and they say that can be eased by reducing the number of items in the questionnaire. Respondents would be more motivated to complete the survey if it is shorter and takes less time to answer (Bista, 2017; Rolstad et al., 2011; Worthington & Whittaker, 2016).

Besides that, the GE survey is also conducted within six months of graduation and the timeframe is not adequate to evaluate PEOs achievement as described in the previous interview session. MQA recommended that PEOs achievement need to be evaluated within three to five years of graduation instead of within six months after graduation (MQA, 2014b). Glasow (2005) stated his concern about changing time references whereas he proposed that the survey that is distributed at different times will lead to seasonal differences of responses. Therefore, the survey has to be distributed and completed at a specific point in time and it is more effective in providing information about the current state of affairs (Denscombe, 2010).

Overall, these findings indicate that a proper survey should be short and specific, in addition being distributed at a more convenient time. Two assessment tools which are alumni survey and employer survey are good enough to measure the PEOs achievement as implemented by the universities in Malaysia. Also, both direct and indirect assessment should be implemented simultaneously so as to get a more precise result.

4.3. The Programme Educational Objectives (PEO) Analysis

Analysis of PEOs was also conducted to compare the PEOs at universities with the PEOs at community colleges. This analysis is made based on PEOs of engineering or technology programme from each institution. The result is presented and tabulated in Table 3 below.

Table3. Comparison PEO of universities with Community College

	PEO	UKM	USM	UPM	UTM	UTHM	UTEM	UniMAP	UiTM	CC
1	Able to conduct research	/	/	/						
2	Able to demonstrate entrepreneurship skills	/				/				/
3	Good leadership skills	/	/	/	/	/	/	/	/	/
4	Creative and innovative in problem solving	/	/	/	/	/	/	/	/	/
5	Effective communication	/	/	/	/	/	/	/	/	/
6	Involved in professional body or society			/	/		/	/		
7	Knowledgeable	/	/	/	/	/	/	/	/	/
8	Positive and ethical attitude	/	/	/	/	/	/	/	/	/
9	Pursue lifelong learning	/	/	/	/	/	/	/	/	/
10	Technically competent	/	/	/	/	/	/	/	/	/

Based on Table 3, PEOs of community college have many similarities with the PEOs of universities. However, considering that the universities' roles are to produce engineers, the universities aim for their graduates becoming professional engineers or attaining the equivalent professional qualification. The bachelor degrees and a number of diploma qualifications, which are recognized by the various statutory professional bodies in Malaysia, enable graduates to be registered as professionals to practice their professions (MQA, 2017). Also, as bachelor programme providers, universities emphasise on pursuing lifelong learning in which the alumni are encouraged to enrol as postgraduates and contribute to the research fieldwork. As for research universities (UKM, USM, and UPM) the graduates must be able to investigate complex problems using the appropriate research methods. These skills are not necessary for Malaysian Technical University Network (MTUN) such as UTHM, UTeM, and UniMAP.

On the other hand, community colleges as skilled and semi-skilled workforce providers and one of the leading edges of TVET institutions focus more on the aspects of technical competence that fulfils the demands of the industries and communities. This aids community colleges to become a renowned institution for education and on-the-job training as preparation before joining the workforce. Community colleges were first designed to produce a holistic human capital that is capable of facing any challenges and provide a highly trained workforce to meet the country's needs in the job market (Rasul, Mohamed Ashari, & Azman, 2015). Besides that, community colleges provide training for a specific job while universities put more emphasis on scientific and systematic knowledge (M. J. Ahmad, Jalani, & Hasmori, 2015). The generic learning outcomes' clusters that apply to all TVET qualifications include knowledge and cognitive skills, functional and work skills, and specific industry-appropriate competencies. The differences in the

various programmes and levels include specialised technical and vocational knowledge as well as agreed occupational standards of specific industries. At least 60% of the programmes are made up of practical components that emphasise psychomotor skills that are strengthened further through industrial exposure and training as part of the curriculum (MQA, 2017).

The graduates should also be able to demonstrate entrepreneurship skills in line with the government's intention to develop entrepreneurship characteristics among graduates and become job creators at the same time (MOE, 2015). Surprisingly, UKM, a research university, and UTHM, an MTUN, aspire to produce engineers with entrepreneurial qualities. This is probably led by the Malaysian government initiative that has made entrepreneurship courses compulsory for all public universities (Buchanan & Ahmad 2015). Apart from that, further attention is also given to the commercialisation of research universities to enrich entrepreneurial activities (Abdulwahed, Abu Hamad, Hasanain, & O. Hasna, 2013).

While there are many similarities in universities and community colleges, they both have different profound roles as a learning hub. Community colleges are designed as lifelong learning hubs that offer opportunities for better job prospects by providing flexible courses to Malaysian citizen through TVET, upskilling programmes, and entrepreneurship education programmes. Due to this difference, community college cannot adopt the universities' instrument to measure the PEOs because these two institutions have different aims and objectives.

5. Conclusions

Based on the data collected and analysed from the interviews and document analysis, it was found that there were several issues with the current instruments adopted by the JPPKK to measure the PEOs. This study has found that

generally the current instrument applied by JPPKK was too broad and not specific to any program. The time allocated for data collection is unsuitable and inconvenient as it does not help the universities and community colleges to evaluate and measure if their respective PEOs are achieved by the graduates. There are also too many items or questions in the survey and they distract the graduates' focus to complete the survey. Lack of stakeholders' point of view has also become an issue that affects the evaluation process. Hence, it is best to adhere to MQA's suggestion by using at least two assessment tools to collect the information; most universities choose to implement alumni survey and employer survey as their tools. In addition to that, the survey should be tailored to follow the suggestions made; the survey should be short, specific, and be distributed at the right time, which is 3 to 5 years after graduates have completed their studies. This study focuses solely on the shortcomings of the current survey instruments used to collect data about graduates. Therefore, further research is suggested to be conducted in studying the instrument to measure the achievement of community college's PEOs.

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A Preliminary Study of Brain-Based Learning (BBL) and Intrapersonal Intelligence in Junior High School Mathematics Learning

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract The purpose of this study is to describe junior high school mathematics learning activities and describe the suitability of the Brain-Based Learning (BBL) learning strategy which focuses on intrapersonal intelligence in junior high school mathematics learning. The research is descriptive and qualitative. The data were collected through documentation studies, observations, and interviews with teachers and students. Teachers and students of junior high school SMP Assahil Lampung Timur Indonesia were involved in this research. The results showed that teachers only used expository learning strategies in learning activities and unsatisfactory learning outcomes. The teachers were never selecting learning strategies which focus on students' internal factors to be applied in learning. Based on these, taking into account the characteristics of learning strategies, students and junior high school mathematics material, it can be assumed that the Brain-Based Learning (BBL) learning strategy by focusing on students' intrapersonal intelligence is appropriate to be applied in junior high school mathematics learning and to enhance student's learning outcomes.

Keywords Brain Based Learning (BBL), Intrapersonal Intelligence, Junior High School Mathematics Learning, Learning Outcomes

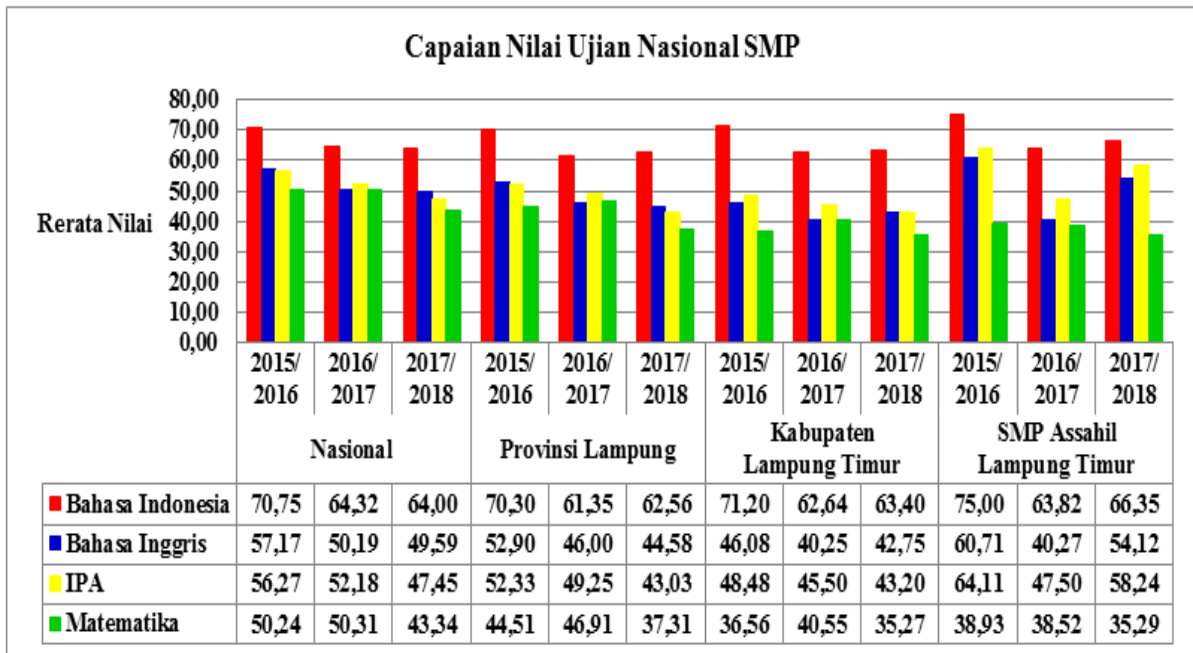
1. Introduction

The implementation of learning strategies is believed to facilitate the achievement of the desired learning goals, namely improvement, and improvement of students' competence (Eggen & Kauchak, 2012). In the learning process, there is an educative interaction between teacher

and students. The teacher, as a learning designer, must be able to determine the right learning strategy to be applied. The choice of learning strategies is based on the characteristics of subjects and the needs of students (Silver, Strong, & Perini, 2012). Many things need to be considered related to the needs of these students including new abilities, attitudes, motivation, independence, learning styles including the varying level of intelligence of students. Conformity to all aspects makes it easy to achieve the stated learning goals.

Benchmarks for the achievement of learning objectives can be seen from students' learning outcomes of the subjects being taught. Through learning outcomes, it can be known to what extent students have competencies by the set learning objectives. Students' learning outcomes for each subject taught in school are reported by subject teachers. Subject teachers determine students' learning outcomes based on specific assessment indicators. The assessment indicators for measuring the achievement of students' competencies in the subject matter learned were carried out through formative and summative tests.

Generally, mathematics is a difficult subject for many students. It can be seen from the many mathematics learning outcomes of students who are not satisfactory. This condition occurs in many schools both public and private schools. SMP Assahil Lampung Timur, one of the private junior high school, also experienced this. The results of the mathematics learning of SMP Assahil students can be said to be unsatisfactory. This condition can be seen from the achievements of the national exam results for the last three years. The following is a graph of the achievement of the SMP National Examination (UN) for the previous three years based on data obtained from the academic year.



Source: processed based on data from The Ministry of Education and Culture of Indonesia

Figure 1. Achievement of SMP national exam scores, school year 2015/2016-2017/2018

The above graph shows that of all subjects tested in the SMP UN, among which the lowest UN scores were math subjects. This condition occurs almost every year in the past three years nationally, Lampung Province, East Lampung regency and school level as in SMP Assahil. The lowest average score of the National Examination in SMP Assahil during the last three years is also on mathematics subjects. In the previous three years, the number of achievement scores in the mathematics UN at SMP Assahil has always dropped every year. In contrast to several other subjects that can exceed the achievements of the district, provincial and even national levels, the achievement of the average score of mathematics UN at SMP Assahil has always been below provincial and national achievements over the past three years.

The low level of mathematics learning outcomes of the students of SMP Assahil indicates that they need improvement in the learning process. The primary growth is the teacher's ability to prepare the right Learning Implementation Plan (RPP). The lesson plan made by the teacher must be following the characteristics of the junior high school mathematics subject matter. The teacher must also understand the aspects of students who come from the internal factors of the students themselves as individuals who will learn. After paying attention to these things, the teacher must be able to carefully determine the appropriate learning strategy to be applied in the learning process. They are considering this need to be researched to describe junior high school mathematics learning activities and describe the suitability of the Brain Based Learning (BBL) learning strategy by paying attention to intrapersonal intelligence in mathematics learning in junior high school.

2. Literature Review

The concept of learning strategies can be interpreted as various types of plans used by the teacher to achieve goals (Silver et al., 2012). In simple terms, this view states that learning strategies are ways to do something in achieving goals. Another opinion says that learning strategies that involve students actively in the learning process through scientific research will further enhance conceptual understanding rather than strategies with passive techniques (Joyce, Weil, & Calhoun, 2009). This view emphasizes activities that accommodate improvisation, involvement, and students' response. Another opinion uses different designations state as an instructional strategy which is a combination of the sequence of activities, ways of organizing subject and student materials, equipment and materials, and the time used in the instructional process to achieve predetermined learning goals (Suparman, 2010). Instructional strategies in this opinion are referred to as a systematic way of communicating lesson content to students to achieve learning objectives.

Branch (2009) argues that learning strategies are organizations and sequences of learning activities (Branch, 2009). In line with this opinion, learning strategies are said to refer to learning activities that are planned and implemented in the process of developing learning (Jonassen, 2013). The two opinions above reveal that learning strategies are structured activities that are deliberately intended to take place during the learning process. While Dick, Carey, and Carey (2009) say that

learning strategies are used in general, and include various aspects in choosing multiple delivery systems, order and grouping content, explaining the components in learning, determining the structure of the lesson and selecting learning media (Dick, Carey, & Carey, 2009). This view expressed explains the scope of the learning strategy for all things that must be considered in the learning process.

Brain-Based Learning (BBL), as a learning strategy, is a concept to create learning that is oriented towards efforts to empower students' brain potential. BBL emphasizes students so they can develop their brains to solve a problem or build information that they obtain. The principle in BBL is that the brain is a *parallel processor* which means it can do several activities at once, learning involves all physiology, searching for meaning, emotions are essential for the whole process of the process and parts of the brain simultaneously. Another principle of BBL is that learning involves both concentration and peripheral perceptions, learning requires both conscious and unconscious processes, memorization, the brain understands the best facts when embedded in spatial memory, learning is enhanced and inhibited by challenges and threats, and each brain is unique (Jensen, 2008).

The application of the BBL learning strategy creates a learning environment that challenges students' thinking skills, fun, active and meaningful learning situations for students. It takes a little time to learn how the brain works in understanding a problem, requires adequate facilities to support learning practices, and requires costs in creating a learning environment that is good for the brain. In applying the BBL, it should be harmonized with all stages in learning so that teachers can optimize the potential of students' brains. The brain works have a significant impact on the effectiveness of learning activities. The teacher needs to help students have appropriate experience and utilize the experience. Knowing how the brain works best allows the teacher to create a learning environment that gives students the opportunity for higher success in learning. Through the application of BBL, it will familiarize teachers in planning careful learning, knowledge of brain research findings, and a little creativity; teachers can offer engaging and brain-based activities that encourage exploration and learning and support learning standards. Teachers and students can build an active learning environment that sees learning as an opportunity to be a successful problem solver while anticipating each new challenge as an exciting learning experience (Ramakrishnan & Annakodi, 2013).

One of the internal factors of students that teachers need to consider in learning activities is the level of intelligence of students. One type of intelligence that is also important is intrapersonal intelligence (Gardner, 2003). The concept of intrapersonal intelligence is also said as self-knowledge which is intelligence that involves self-awareness or self-sensitivity, the process of thinking, awareness of changes that occur in oneself, requires the skills of

cooperating and communicating both verbally and nonverbally (Alder, 2001). Intrapersonal intelligence lies in a person who is characterized by the ability to understand themselves and act on that understanding. The intended ability is the ability to recognize strengths in themselves, their shortcomings, self-limitations, intelligence on emotions or moods, desires, motivations, intentions, and goals, and to respect themselves and control themselves.

Based on the definition, three components of intrapersonal intelligence can be identified, namely the ability to experience different feelings deeply with passion, enthusiasm, and spontaneity, the ability to be assertive and recognition of self-esteem (Amstrong, 2002). This ability also includes the ability to analyze oneself, know well about himself, what he wants, what to do, what is best for him, and how to respond to specific situations, and react to them well, and self-reflection. This self-understanding is very good to help someone develop their potential and help them to express themselves better, and be able to work optimally. Intrapersonal intelligence has the benefit of building self-image and self-esteem, controlling emotions, being able to be accountable to oneself.

Learning strategies and internal factors of students are two things that must be considered by the teacher in planning and designing learning activities, in this case, including mathematics learning. Learning is more directed at construction than instruction, which has implications for the role of teachers and students (Reigeluth & Carr-Chellman, 2009). This concept reveals that in learning activities students construct their knowledge. Construction refers to students who are more active in completing things in the learning process so that there is a relatively permanent process of influence on students in the form of knowledge, attitudes, and skills acquired through experiences designed by teachers (Santrock, 2010). Concerning learning in the meaning of this construction, Joyce, Weil, and Calhoun (2009) state that teachers must facilitate students in obtaining information, ideas, skills, values, ways of thinking and goals of expressing themselves (Joyce et al., 2009). Implicitly these views explain the role of the teacher in learning which involves students in tasks that are loaded with challenges and creativity so that it makes it easier for students to absorb and master information while the role of students can describe information and ideas through the use of various existing learning resources.

The various learning concepts described above provide an understanding of the learning activities that should occur. The knowledge is that learning activities must be deliberately planned and designed by the teacher to create a learning process that can actively involve students. Students must actively interact with various learning resources that exist in developing their potential to improve the expected competencies. This kind of learning activity must be applied to all subjects taught at school.

One of the subjects taught at school is mathematics. Kline (1962) states that mathematics breaks down numbers, constructs geometric space, and expands ideas about numbers and constructs of geometric space (Kline, 1962). Another view says that mathematics is a science of logic concerning the form, arrangement of magnitudes, and related concepts which are divided into three fields, namely algebra, analysis and geometry (James & James, 1976). Mathematics is also called a thinking pattern, a pattern of organizing and logical proof that is carefully defined, clear, accurate and represented by symbols (Johnson & Rising, 1972). Meanwhile, Kneebone (2001) briefly states that mathematics is only the study of general structures or regular patterns of connectedness (Kneebone, 2001). Referring to the above views, mathematics is a science of logic that is built and described with symbols or language symbols, and systematically defined and interrelated between existing concepts. The logic is developed, explained and the proof through deductive reasoning.

The concept of mathematical learning is closely related to learning theory, the formulation of learning and the definition of mathematics itself. Watchel (2007) states that mathematics learning is learning about composing numbers, geometry and mathematical concepts (Wachtel, 2007). Another similar opinion states that mathematics learning as a learning process that involves students actively in constructing mathematical knowledge (Cobb, 2013). The two formulas emphasize the activities of students building mathematics subject matter, thinking logically, collapsing and creative. Mathematics learning is seen as a process of developing students' creativity to improve their ability to believe in constructing knowledge to have a good mastery of mathematics subject matter.

Learning mathematics, according to Bruner (2009), is learning about the concepts and structure of mathematics and looking for relationships between the two on the material being studied (Bruner, 2009). This view focuses on solving problems, forming mindsets, understanding, and reasoning for a relationship in mathematical material. Meanwhile, Dienes (2008) revealed that mathematics learning is a learning activity that involves a hierarchical structure of high-level concepts that are built based on existing initial concept formation (Dienes, 2008). Similar thoughts state that in learning activities, learning materials must be adapted to the abilities and cognitive structures of students. Learning material must be related to the concepts that are already owned so that new ideas can be fully absorbed by students (Ausubel, 2012). Both of these thoughts emphasize that in mathematics learning activities that occur must be gradual and sequential and always based on past learning experiences.

3. Methodology/Materials

The research approach used in this study is qualitative

with descriptive methods and literature studies. This research was conducted at SMP Assahil Lampung Timur in the 2018/2019 academic year. Respondents in this study were students and mathematics teachers. Data collection techniques in this study used documentation studies, observations, and interviews. Data analysis uses quantitative and qualitative descriptive analysis. The quantitative descriptive analysis describes the data collected and presented in the form of tables and graphs related to mathematics learning outcomes over the past three years. Qualitative descriptive analysis reveals events or facts, circumstances, and phenomena that occur by interpreting and interpreting the collected data related to the learning process of mathematics that has been going on.

4. Results and Findings

In general there are six characteristics of mathematics, namely having abstract study objects, referring to the agreement, deductive thinking, consistent in the system, having symbols that are empty of meaning, and paying attention to the universe of conversation (Soedjadi, 2000). The object of study which is abstracts of mathematics in school includes facts, concepts, operations, and principles whose discussion refers to the agreement. Statements of mathematics are obtained through a deductive mindset. The meaning and truth value of statements in the system of mathematics applies the law of consistency. Namely, there is no contradiction in it. An empty mathematical symbol or model of meaning so it must always be associated with the universe of conversation in every problem-solving.

At the junior high school level, the characteristics of mathematics subject matter are determined through Minister of Education and Culture Regulation number 37 of 2018 which regulates Core Competencies (KI) and Basic Competencies (KD) lessons in the 2013 curriculum in primary and secondary education. The appendix 15 of the regulation contains KI and KD of SMP/MTs mathematics in which it explains the material characteristics for each grade level. For 7th grade, the attributes of the subject matter include factual, conceptual and procedural of numbers, sets, algebraic forms, social arithmetic, relationships between angles, various types of quadrants and the relationship between data by way of presentation. In 8th grade, the characteristics are factual, conceptual and procedural including the pattern on the line, the field of cartesian coordinates, relations, functions, Pythagoras, angles, tangents, building space, data distribution, and opportunities. Whereas 9th-grade characteristics are factual, conceptual and procedural from the form of roots, quadratic equations, geometric transformations, flat and built spaces.

The characteristics of junior high school students according to their age ranging from 12 to 15 years are early adolescents. These characteristics include physical,

emotional, social, personality, intellectual and moral development (Santrock, 2017). Physically, adolescents experience significant structural changes, but emotional development has not reached maturity, especially in terms of controlling feelings. The social construction of adolescents is at the stage of seeking identity and self role while for personality development five things become factors namely openness, prudence, sociability, friendliness, and emotional stability. Junior high school students as early adolescents enter intellectual development which is at the formal operational stage (Piaget & Inhelder, 2010). In moral development, junior high school students enter the conventional level stage which is related to the consequences of social actions and rules.

SMP Assahil students have characteristics like teenagers in general. Most of the students of SMP Assahil are indeed *santri* at the Assahil Islamic Boarding School so that the characteristics of the *santri* are also attached to these students. The characteristics of *santri*, in general, include obedience, independence, simplicity, togetherness, and kinship (Purwoko, Jahi, Asngari, Gani, & Hisyam, 2017). Compliance of *santri* towards *kyai* and the *ustadz* especially in religious matters so that they have independence in managing and fulfilling all their own needs. The limitations of what in a boarding school makes the *santri* have simplicity, togetherness, and kinship in carrying out all their daily activities (Purwoko et al., 2017). The characteristics of the *santri* are suited with aspects that become a benchmark for one's intrapersonal intelligence.

Understanding of the characteristics of mathematics subject matter and the characteristics of students in junior high school becomes a reference for teachers in choosing the learning strategies that will be applied. Many learning strategies can be selected by the teacher to be involved in the process of learning mathematics. Some learning strategies that can be chosen include expository, inquiry, problem-based learning, increased thinking ability, cooperative, contextual, project-based learning, and brain-based learning. Each learning strategy has its characteristics. Learning strategies implemented by teachers must also pay attention to students' internal factors; one of them is the level of intelligence (Sumantri, 2015).

During this time the learning strategies applied by the mathematics teacher at SMP Assahil based on information and observations showed characteristics that suited expository learning strategies. There are at least three characteristics of expository learning strategies, namely verbal material delivery, the material delivered and mastery of subject matter (Sanjaya, 2013). The teacher plays a very dominant role in the learning process using this strategy. An expository learning strategy is a form of teacher-centered learning approach. Instead, it is necessary for teachers to implement student-oriented learning strategies that are believed to be able to improve students' learning outcomes further.

Many alternatives can be used by the teachers to improve the quality of the learning process carried out. The option is among others through the selection of the right learning strategies to be applied, like student-oriented learning strategies. It is learning strategies that suit the characteristics of the subject matter and student characteristics. The application of appropriate learning strategies will facilitate the achievement of defined learning goals and can improve students' learning outcomes (Syakdiyah, Wibawa, & Muchtar, 2018). Many strategies can be chosen by the teacher to be applied in learning activities. Important things that are taken into consideration in the selection of learning strategies are related to the support of psychological theory and theories about learning as well as those associated with the effectiveness of achieving learning objectives. Both of these are also associated with the learning design process which must both consider learning objectives, students' characteristics, technical implementation of learning and assessment needs. All of these are taken into consideration when deciding which learning strategies are suitable for the application.

In addition to learning strategies, other things that need to be considered by the teacher in the learning process are students' internal factors. The internal factors of students include physiological and psychological factors. Physiological or physical factors, namely something are innate or hereditary as well as those obtained, such as vision, hearing, body structure and so on. Psychological factors are also congenital or acquired, which consist of intellectual factors or potential factors such as intelligence and talent and real factors or real skills, such as achievement. Non-intellectual psychological factors are components of individual personalities such as attitudes, interests, habits, needs, motivation, self-concept, self-adjustment, emotional and so on. To improve students' learning outcomes, teachers need to pay attention to these internal factors which are characteristics of students (Salam, Ibrahim, & Sukardjo, 2018).

The linkages between learning strategies and students' internal factors towards learning outcomes have been strengthened by several research results including the findings conveyed by Sumantri and Supendi (2010) that the learning strategies applied by the material characteristics taught can improve student's learning outcomes (Sumantri & Supendi, 2015). Another finding suggests that the application of the Brain Based Learning (BBL) learning strategy of teachers can improve students' conceptual understanding of mathematics learning which has a positive effect on learning outcomes (Suarsana, Widiasih, & Suparta, 2018). Related to the correlation of students' internal factors to the learning outcomes of mathematics there have been many research findings produced; one of them was conducted by Ibrahim (2012) which revealed that internal factors in the form of achievement motivation students have a positive relationship with learning

outcomes (Ibrahim, 2012). Referring to these findings, it can be said that high student achievement motivation can improve mathematics learning outcomes. Based on the description of the conditions above, the mathematics learning outcomes of junior high school students are highly dependent on the learning strategies applied by the teacher by considering the internal factors of the students.

In mathematics learning, the applied learning strategy must be able to involve students actively in using their thinking potential in solving math problems. These characteristics suit the Brain Based Learning (BBL) learning strategy which emphasizes that students play an active role in constructing the concepts learned (Ulger, 2018). There are three steps in the BBL learning strategy, namely:

- 1) Creating a learning environment that challenges students' thinking skills (*orchestrated immersion*)

The phase is *orchestrated immersion* focused on making the subject matter in learning more meaningful and enduring in the students' memories. This phase helps students make patterns and associate with their brains when they are given problems that are rich in learning experiences so that the learning gained will last longer in the memory of students. In each learning activity, it is necessary to provide subject matter questions that facilitate students' thinking skills. The lesson questions are as functional and interesting as possible, for example through puzzles, simulation games, etc, so that students can get used to developing their thinking skills in the context of empowering students' brain potential.

- 2) Creating a learning environment *relaxed*

For the phase *relaxed alertness*, students are challenged to solve a problem well but minimize the threats that can be obtained if they cannot do their best, because learning outcomes become higher when someone is comfortable without risks. Learning can be varied by bringing students to study outside the classroom at certain times, accompanying learning activities with music that is appropriately designed according to the needs in the classroom, learning activities with group discussions interspersed with exciting games, and other efforts that eliminate discomfort in students.

- 3) We are creating actual and meaningful learning situations for students (active processing).

The phase is *active processing* done by forming study groups that facilitate students so that students can absorb information well, but students must still be given awards even though the results of their performance are not optimal. Students are stimulated through learning activities to be able to build their knowledge through the active learning process that they do themselves. Make a learning situations that allow all members of the student body to move optimally, for example, the eyes of students are used to read and observe, students' hands move to write, students' legs move to play in learning, mouths of students

actively ask and discuss, and productive activities of other limbs.

The internal factors of students are expected to support the creation of learning conditions that apply the BBL learning strategy namely intrapersonal intelligence of students. Three main aspects can be used as benchmarks, namely:

- 1) Identifying yourself

The aspect of recognizing yourself is an accurate and realistic ability regarding the strengths and weaknesses of one's potential which includes emotional awareness, assertiveness, self-esteem, independence, thought processes, self-discipline, and self-actualization.

- 2) Knowing your own desires

Aspects of knowing your desires are the ability to identify your own needs to encourage you to fulfill them which include self-motivation, skills in set finding goals and clear and precise steps.

- 3) Knowing what is necessary to oneself

The aspect of knowing which is needed for oneself is the ability to qualify the sequence of needs or self-interests which include, among others, the attitude of making the right decisions based on the values of self-consideration.

The implementation of mathematics learning in schools requires stages of learning by students' mental and cognitive development. This condition includes the presentation, mindset, limitations of the universe, and the level of abstractness that must be adapted to the intellectual development of students. Mathematics subject matter must be delivered in stages from real concepts to more abstract concepts using symbols. The purpose of mathematics is taught in school so that students can understand mathematical concepts, use reasoning, problem-solving, communicate ideas and have an attitude towards appreciating the usefulness of mathematics in life.

Referring to the ideas about mathematics learning that have been stated previously, mathematics learning is a process that is deliberately designed to create a learning atmosphere that allows students to learn mathematics actively. There is a process of interaction between teachers, students and learning environments that are deliberately created by teachers with various strategies. Interactions that allow students to experience meaningful learning. Students can associate new knowledge with structures that have been previously owned. Mathematical learning that is capable of constructing knowledge involves transforming information, discovering new concepts and experiences in learning mathematics. Pay attention to that, it can be stated that conceptually there is a match between the characteristics of junior high school mathematics material, the features of BBL learning strategies and the characteristics of intrapersonal intelligence that have a potentially positive impact on the learning process of mathematics and can improve students' learning outcomes.

5. Conclusions

In mathematics learning at SMP Assahil Lampung Timur, students only receive knowledge passively. Students have not been able to construct their knowledge, so learning becomes less meaningful. The condition is evidenced in the mathematics learning outcomes that are less satisfactory and relatively low for the past three years. Based on the results of the study of documentation, observation, and interviews conducted, it was found that the learning activities that had taken place so far only used expository learning strategies. The teacher has never made a selection of learning strategies by paying attention to students' internal factors to be applied in learning. In concept, there is a match among the characteristics of junior high school mathematics material, the characteristics of BBL learning strategies and the characteristics of intrapersonal intelligence. Based on this, it is very potential for junior high school mathematics learning to apply BBL learning strategies by considering intrapersonal intelligence, to improve students' learning outcomes.

Acknowledgement

This research was supported by Universitas Negeri Jakarta and SMP Assahil Lampung Timur, for which thanks to 1) Doctoral Program in Educational Technology, Postgraduate Program at Universitas Negeri Jakarta; 2) SMP Assahil Lampung Timur; 3) Prof. Dr. M. Syarif Sumantri, M.Pd. as the promoter and Prof. Dr. Nurdin Ibrahim, M.Pd. as the co. promoter who always provides input and guidance for the author.

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Merging of Metacognitive Regulation Strategies and Activity Based Learning through Best Seller Mathematical Learning Activities to Enhance Student's Mastery of Mathematics

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract Metacognitive Regulation Strategies (MRS) and Activity Based-Learning (ABL) is a learning strategy that is significant and have proven to effect student's mastery. The student's ability to plan, monitor and evaluate the learning process and their thinking process, known as metacognitive regulation, can strengthen the understanding. ABL also has significant positive effects on students' level of interest, engagement and performance. Through the activity, students developed their communication skills, self-regulation and the learned knowledge has positive effects on retention due to learning by doing and having fun while learning. In fact, Best Seller Mathematical Learning Activities (Apm-BS) merges principles and strategies from the activity during learning and metacognitive regulation skills. This conceptual paper tries to discuss the potential of merging activity based learning and metacognitive regulation learning strategies as an intervention to the problem of mastering the mathematical concept of students. This activity was designed and created based on the basic of the concept of entrepreneurship, which involves buying and selling activities among students during the learning process. Students communicate and interact with peer to practice the metacognitive behavior and improve metacognitive skills in order to enhance their understanding.

Keywords Metacognitive Regulation Strategies, Metacognitive Regulation, Activity Based Learning, Mathematical Learning, Student's Mastery

1. Introduction

A mathematical thinker is an individual who is creative and innovative and is able to meet the demands of the 21st century. However, the constraints to fulfilling these goals are the problem of students to understand the mathematical concepts (Noor Hidayah & Zanaton, 2017). The issue of poor mastery of concepts in mathematics is not to be underestimated and need immediate solutions in an effective way. So, what is needed is the cooperation of all stakeholders to act accordingly to overcome this problem. Students who do not master the mathematical concepts and do not understand the topics' need consider mathematical subjects as difficult and unpredictable (Du Toit & Kotze, 2009; Effandi & Norhidayah, 2015; Nor Esah & Nurulwahida, 2016; Aizu & Hasbiah, 2017). In this regard, Syed Azman & Siti Mistima (2017) argued that students would forget the mathematical concept and lost confidence when failing to solve mathematics questions.

Good metacognitive development, capabilities and practices are closely related to effective learning. While effective learning is influenced by activities during the learning process (Wan Hasmah & Nur Munirah, 2015). Teacher practices play a role in improving students' metacognitive skills. Thus, the learning approach selected by the teacher should be in line with the student's metacognitive needs (Noor Hidayah & Zanaton, 2017; Kyairaniah, Mohd Isa & Maimun, 2017; Adnan & Arsad, 2018). On this basis, the researcher sees the need for in-depth studies to see the relationship between conceptualization, metacognitive and appropriate learning activity factors. Perhaps this study can be used as a solution to solve mathematics performance problems especially in

schools. It is hoped that the present study will contribute to the learning field in order to enhance student's mastery of the mathematics contents.

2. Mastery of Mathematics among Students

Mathematics is an abstract, using figures and symbols and requires thinking skills (Poh, 2000; Halim, 2011; Chris, 2015). According to Chris (2015) mathematics also includes logic, reasoning and critical thinking. That's why mathematics is considered difficult by some students (Noor Erma & Leong, 2014; Du Toit & Kotze, 2009). Mathematics is also considered a killer subject and is not an interesting subject (Nurul Nashrah & Effandi, 2017; Nor Ezah & Nurulwahida, 2016). However, according to Noor Erma & Leong (2014) there are still students who shows good achievement as well as those who remain in control of the mathematical concept despite being faced with easy topics. This is because, according to Harizon (2014), the way students understand the mathematical facts, realize the process, solve the problem and make generalization of the topic is through the student's own awareness of the learning process.

Besides that, the learning method also affects the awareness of learning process to master the concepts and math skills (Aizu & Hasbiah, 2017). In that regard, the learning process should ensure that students can use the process of thinking and interaction skill. The students themselves need to be aware of their level of ability, which means that, they are knowing and aware of the potential of their thinking. Knowing the right and convenient way to learn, it may reduce the problem of mathematical learning. In this situation, the student's self-regulation about the thinking process and the action cause of that is the prediction of the learning process. The weakness of mathematical mastery among students is due to ignoring the metacognitive regulatory capacity that greatly influences the learning process of mathematics.

Metacognitive regulation is the highest component of metacognition other than metacognitive knowledge (awareness) and metacognitive experience (Du Toit & Du Toit, 2013; Crawford, 2018). Through awareness and metacognitive experience, students will regulate their cognition to plan activities and thinking actions towards achieving learning goals (Crawford, 2018). If students can plan, control and evaluate their cognitive abilities in mathematical learning, the student can master the mathematical concept. Thus, its importance to mathematical teachers determines the best approaches so that aspects of metacognitive regulation can be improved. This is because real mathematical performance is determined by metacognitive regulation and not merely having knowledge or cognitive awareness.

3. Metacognitive Regulation Strategies (MRS) and Activity Based Learning (ABL)

Metacognitive regulation is a component of metacognition. There are three subcomponents, namely planning, monitoring, and evaluating. According to Do Toit & Do Toit (2013) metacognitive regulation refers to the control of actions that students undertake in their learning process. Schraw & Moshman (1995) states that these aspects are: i) planning ie planning, determining goals and studying resources and learning needs; ii) information management, which refers to the sequence and strategies used during learning among them to process information more efficiently, for example organizing, describing, summarizing or focusing; iii) monitoring of a own learning process or monitoring the use of learning strategies; iv) debugging is a method or strategy used to correct mistakes and weaknesses; and v) evaluation is a process or act of analyze the effectiveness of learning, finding, results, mastering or performance and evaluating strategy after learning experience.

The effectiveness of mathematical learning is strongly influenced by the effects of individual metacognitive regulation. According to Moos & Ringdal (2012) this metacognitive regulation will spontaneously begin when a mathematical tasks is given by addressing the process to four phases. Understanding mathematical problems is the beginning of this cognitive process, at this stage metacognitive knowledge will play a role. However, subsequent metacognitive regulation will continue the cognitive process by setting goals, designing, selecting strategies, using strategies and then refocusing them with the evaluation phase. Obviously, metacognitive regulation plays many roles in ensuring students can solve problems or mathematical tasks.

Activity-based learning is a learning approach from the understanding of active learning theories and the development of constructivism philosophy. This activity learning approach was first introduced by David Horsburgh. For mathematical learning purposes, it is termed an Activity Based Teaching of Mathematics which involves students doing activities such as reading, writing, discussing, practical activities, problem-solving activities, analysis, synthesis and evaluation (Festus, 2013). According to Pokhrel (2018) the activities involved in this approach are like the use of materials, models, forms, charts, pictures, posters, games and experiments. In the context of learning, it is about what are doing, activities, situations and exercises with the aim of providing knowledge, skills and enhancing students' understanding. This activity will create conducive learning environment.

According to Nik Azis (1999) effective mathematical learning is in the form of a combination of diverse activities, and effectively and continuously interactions occur. For the purpose of applying and using the ABL

approach to transform the mathematical learning of students, Bonwel & Eison (2013) has outlined some features of ABL as a guide:

- a. involves learning activities that enable students to develop their potentials and skills that are more than just listening to, not just receiving or transferring information
- b. involves students in high-level thinking skills such as, analysis, synthesis and evaluation
- c. are more likely to be exploring the attitudes and self-appraisal of the students

In relation, the ABL principle also directs the development of metacognitive regulation through metacognitive learning strategies. According to Hasbullah (2015) activity is a mediator or tool that can be a moderator of metacognitive regulation. In addition, ABL also helps students learn independently and use their potential. In this context, Raudys (2018) describes ABL's impact on students' self-esteem as: i) students will remain focused on being active, ii) learning in new and different situations ie with full attention, emotion and more dynamic, iii) focusing on problem-solving and more critical.

The effectiveness of implementing strategies based on practically metacognitive skills is much discussed in studies that show increased student achievement. Among them are studies by Leidinger & Perels (2012), Hasbullah (2015), Listiani, Wiarta & Darsana (2014), Nongtodu & Bhutia (2017), Cheng (2011), Shaw (2008), Su, Ricci & Mnatsakanian (2016) Stephanou & Mpiontini (2017) and Noorzeliana, Norazilawati & Saniah (2015). Their positive results are clear that metacognitive greatly influences learning. Many researchers conclude that through metacognitive strategies, it can encourage the strengthening of knowledge in improving students' achievement.

Metacognitive skills can relate to the previous knowledge and form the new knowledge about mathematics, it reduces the nature of interconnectedness that exists due to the nature of the mathematical knowledge itself (Hasbullah,2015). Researchers also found that aspects of metacognitive regulation strongly influence students' performance, e.g aspects of monitoring, evaluating and following aspects of planning (Cheng,2011; Stephanou & Mpiontini,2017). In addition, metacognitive skills can also develop problem-solving and thinking skills that will also have a direct impact on students' achievement. Students will be more careful in accuracy, perfection and self-determination in solving mathematical problems (Shaw,2008). The solution learned by the student will also enhance the thinking skills and give the impression that previous knowledge has been combined with new knowledge, applied and synthesized in a new form (Su, Ricci & Mnatsakanian,2016).

Studies by Altintas & Ozdemir (2012), Muhammad, Niaz, Maqsood, Faiza & Sher Aman (2012), Hussain, Anwar & Majoka (2011), Celik (2017), Khonchaiyaphum,

Srikunlaya & Rakrai (2017) and Yuksel (2013) shows the ABL's impact on students' learning and have a positive impact on achievement. The researchers found that ABL's approach can increase the critical thinking skills and the attitudes of mathematical problem-solving also change (Altintas & Ozdemir,2012). It can be concluded that in ABL, students are more motivated to think, criticize and ask questions. This activity can expose students to debates, collaborative learning, ideas, project creation, project presentation and positive attitude.

Therefore, in order to ensure learning process can improve the mastery of the students, the suitable and interactive activities should be provided. By involving and doing the activities, students can develop and train their metacognitive regulation skills that are seen to improve the self-regulation, to change their attitude towards learning positively and improve student's thinking skills. Thus, designing and developing learning activities in line with the needs of metacognitive regulation are required. In addition, further studies are also needed to relate the activity-based learning to satisfy the metacognitive regulation learning strategies.

4. Conceptual Framework of Best Seller Mathematical Learning Activities (Apm-Bs)

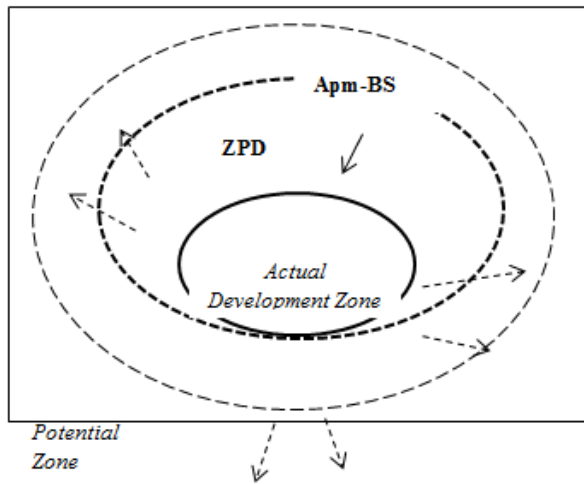
4.1. Design Principles of Apm-BS

The study was aimed at designing, implementing, and evaluating the effectiveness of learning activities through buying and selling simulations. Based on the Constructivist Theory, Vygotsky Social Development Theory and Metacognitive Theory, constructs are seen to influence students' learning. Constructivist theory states that learning is the process that students make modification of previous experience and knowledge in order to construct the new ones. Interactions, mediations, guidance and scaffolding become the important elements in Vygotsky's Theory to reflect the ability of the student in learning. While Metacognitive Theory proposes a metacognitive based learning strategy to optimize mental function in learning. So a conceptual framework can be built to see the relationship between the aspects or elements that will be the variables in this study.

Based on how the learning occur through the understanding of the theories, researchers design and develop an activity named Best Seller Mathematical Learning Activity (Apm-BS) with the 4P's McCarthy Marketing Model. So Apm-BS will be an independent variable in this study including the 4P elements that are related to products, prices, places and promotions in the activity. This 4P element will be contained in the phases of the activity to be designed. This apm-BS will be assessed to look at the students' mastery. Thus, the dependent variable

in this study is the mastery of the student which will be an important measure of the effectiveness of the Apm-BS, while metacognitive regulation, including its components, planning, monitoring and evaluation will act as a moderate variable.

The present study is also a concept of intervention study. Apm-BS is a teaching method that implements treatment of conventional mathematical learning. The activities contained in them are expected to strengthen metacognitive regulations that encourage students to correctly solve mathematical problems. It is hoped that the mastery of the students can be enhanced through Apm-Bs activities.



Source : Adapted from Tamil Selvan (2015) and Mcleod (2018)

Figure 1. Learning Concept of Apm-BS

4.2. Implement of Apm-BS

Since the design of this activity uses buying and selling as an intermediary of activities, there are some terms of the marketing used. In summary, in this activity the students will be divided into two groups namely 'seller' and 'customer' groups. The teacher is a 'banker' that controls the marketing process. In the context of learning, teachers are just as a provider of learning environment and will act as guiders and facilitators. The contents of the lesson refer to the 'product' which will be the source and learning materials. The 'product' is a mathematical question or specific task that needs to be solved. If the 'product' in the marketing world has a price, then in this activity the 'product' also has a certain price which is actually the level of difficulty according to Bloom's Taxonomy.

Then, a 'seller' group will plan a marketing strategy in the 'marketing planning' phase. The process of learning in this phase is actually a process during which a student solves mathematical problems, conducts operations and calculations in small groups cooperatively. The next phase is the process of buying and selling, which refers to the standard of promotional activities in marketing. 'Promotion time' will be the climax phase of learning activities and processes when students from the 'sellers' group sell, deliver explanations, explain, attract attention, or teach the 'customers' groups to understand mathematical concepts and solutions. During the 'promotion time', 'seller' applies peer tutoring and reciprocal teaching methods. Purchases will occur when the customer is satisfied with the explanation and understands the presentations. Next in the last phase of the activity, the calculations are made to determine the 'seller' that will be awarded of 'best seller'.

Table 1. The Apm-BS Related To Teaching And Learning Process

CHARACTER/ ROLES	Apm-BS ACTIVITY	TEACHING AND LEARNING PROCESS
BANKER -Teacher	- Financial control	- Provides learning contents - Guiding students - Controlling time
SELLER -Student	- Salesperson - Selling products	- Teaching other students (presentation)-peer tutoring - Give relevant examples - Guiding
CUSTOMER -Student	- As a customer - Buyer	- Learner - Listening - Asking questions
PRODUCTS	- Sales products	- Learning content - Worksheet - Questions
MARKETING PLANNING	- The marketing strategy to be determined by the salesperson	- 1 or 2 students answer the questions cooperatively - Solve problems - Set up the presentation needs
PROMOTION	- Time to promote the product - Time to purchase	- Presentations - Teaching and explant to others - Reciprocal Teaching
BEST SELLER'S TAG	- Title to salesperson with highest sales	- Reward to active students

5. Merging of Activities and Metacognitive Regulation Strategies in Learning

Basically, the development and design of these learning activities is an alternative approach and intervention of learning methods. Accordingly, the implementation of Apm-BS is based on the use of the instrument, which is a kit that contains hands-out consisting of a product, a sample of money and a 'best seller' tag. This interactive learning application in the form of offline technology is seen to be more flexible and facilitate teacher work. Basically, Apm-BS is a learning activity through a game of competition. Accordingly, the competition should have certain goals and targets to be achieved. In this activity, the goal can be seen from two points. The first is during the learning process, where the student must achieve victory in the competition. In the context of Apm-BS, the winner is to get the highest earning money that is directed to the student who plays as a salesperson. The title and "Best Seller" award will be given to the student. Second is, at the end of learning, the objective of learning. Master the concept, increase understanding, improve thinking skills and so on are the goals and objectives of learning. According to Hasbullah (2015) and Smith & Mancy (2018) when learning activities require students to plan, set up the goals and targets, act on their planning strategies and constantly evaluate learning acquisitions, they relate to metacognitive regulation. This process can improve the students' thinking skills and potential.

It can be concluded that, through the implementation of activities, it have a positive effect on the students. Activities can be a medium for students to develop many aspects that will be an increasing factor of understanding. Through activities, according to Schraw & Moshman (1995), Hasbullah (2015) and Nor Hidayah & Zanaton (2017) can create skills in planning, monitoring and evaluating the learning process. The metacognitive skills can be enhanced through the self-regulation of students which also affects their attitudes and motivations. Previous experiences and active experiences during learning can be structured well through this activity. In addition, according to Pantiwati & Husamah (2017) and Menz & Cindy Xin (2016) activity can also be used as a tool for evaluating learning. This assessment process can occur independently i.e prologue (Menz & Cindy Xin, 2016) or through interaction during activities (Pantiwati & Husamah, 2017).

Applying this approach as a teaching and learning practice is essential to achieving effective learning goals. The features and principles of Apm-BS are also conceptualized by active learning and metacognitive development. Through activities, students will evaluate and look at something from the point of view, find similarities, evaluate causality, make predictions and estimates, not just memorizing and even be responsible for new experiences and knowledge (Raj, 2015). This

coincides with the recommendation by Su, Ricci & Mnatsakanian (2015) which proposes a strategy that allows students to think, regulate and coordinate their thinking to achieve mathematical learning outcomes.

When students are constantly exposed to cooperative or collaborative learning, they will communicate and interact with peers. Mathematical problem-solving becomes easier when they are guided by individuals with higher skill levels. Intellectual abilities will increase when students master the new concepts and skills, this will directly expand the current knowledge zone to the zone with high potential such as improvements in critical thinking skills (Taylor, 1992). This process will repeat in the next learning and can increase the mastery of the mathematical concept of the students.

6. Conclusions

The change in students' learning style illustrated in this study is due to excite, motivated and fun through the learning activities. Mastery can also be improved as students undergo self-regulation, and change learning strategies to continuously explore knowledge (Farah & Che Nidzam, 2014). These situation shows the development of metacognitive skills has done. Being active and guided is the effect of planning, exploring and interacting is the effect of monitoring component, while the evaluation component can be seen when self-determination or self-concept will strengthen the students' understanding.

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The Evaluation of Integrated and Holistic Education System (Ihes) Program in Gema Nurani Integrated and Holistic Islamic Elementary School, Bekasi, West Java

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract This study aims to evaluate design, installation, process, outcome, benefit and cost in implementation of Integrated and Holistic Educational System (IHES) model in Gema Nurani Integrated and Holistic Islamic Elementary School, Bekasi, West Java. This study was conducted by using descriptive evaluative research with Discrepancy evaluation model. Data was collected through the result of interview, observation and documentation validated through Focus Group Discussion (FGI) activity. The result of study showed that: 1) The aspect of Design in implementation of IHES model in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java has been based on IHES program owned by that school. 2) The aspect of Installation in implementation of IHES model had been completed by Standard of IHES Implementation in school which consist of standard components, namely: 1. Material Mastery, 2. Learning Media, 3. Fund Arrangement, 4. Arrangement and Determination. 3) Aspect of Process in implementation of IHES Model has not been in accordance with established standard particularly in standard component of the process in implementing IHES model, that is, there is no special laboratory particularly for Science subject. 4) The aspect of Outcome in implementation of IHES model has been in accordance with established standard. 5) The aspect of Cost and Benefit Analysis in implementation of IHES model in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java has been in accordance with established standard. Therefore, infrastructure and training for all school members still need to be added to implement IHES model in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java.

Keywords IHES Model, Evaluation, Discrepancy Model

1. Introduction

Integrated and holistic education is an effort to prepare elementary school students to become graduates who are equipped for the life on the earth and afterlife. As mandated in Act No.20 year of 2003, article 1, clause (1) and (2), that Education is conscious and planned effort to realize learning atmosphere and learning process in order that students develop their self potency actively to has religious spiritual power, self control, personality, intelligence, lofty moral, and skill needed by themselves, society, state and nation. National education is education which is based on Pancasila and 1945 Constitution of The Republic of Indonesia which rooted in religious values, national culture of Indonesia and responsive to the demand of era change.

By implementing IHES model, it is expected that students acquire learning in academic, attitude and Islamic education, so beside mastering academic aspect in school, students also will have attitude which is in accord with Islamic tenet and also for prepare themselves for the life for ever and hereafter. The availability of this IHES model help students to become smart in academic, has polite attitude and capable to apply the content in Quran given by their teachers. Therefore, this IHES model is absolutely available as means to maximize academic potential, shape attitude and character and inculcate the values of Quran and Sunnah. Another advantage is that learning is integrated with the values contained in Quran and Sunnah and it can be done as school effort to shape students' character in accord with Quran and Sunnah.

Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java is the one and only school in Bekasi even in Indonesia which use IHES model as educational model in school, the implementation of IHES model become means to improve IMTAQ and IPTEK in Gema Insani Integrated and Holistic Islamic Elementary School,

Bekasi, West Java because according to researcher's tentative observation, there is still discrepancy between outcome and goal of predetermined program.

Based on study background above, the aim of this study is to evaluate design, installation, process, outcome and cost and benefit analysis in implementation of IHES model in Gema Nurani Integrated and Holistic Islamic Elementary School, Bekasi, West Java.

2. Materials and Methods

The policy issued by Department of Education through School Based Management (SBM) enable school to do management fully in accord with the needs of school environment. Through that policy, school is given autonomy right to manage school by using education model suitable with the needs of surrounding community and also to keep up with era development. To produce competent graduates, school needs to equip their students among others through academic, shaping character through attitude judgment, Islamic values for prepare themselves for the life in ever and hereafter.

In addition, it can be understood that school today can shape students' character which is appropriate with religious values. It is expected that the religious activity done in school can form students' character to become more religious. The religious activity integrated into national curriculum learning can be so meaningful for students.

Besides national curriculum learning, students also learn about Islam in accord with learning material done in class. According to (Griffin, 2014), in *The Heart of Holistic Education* journal: *The Heart of Holistic Education* is expressed through the experience of its innovative models. The heart of holistic education lies in thirteen supporting core essences, arranged into six related groupings (a) ancient wisdom, consciousness, and peace; (b) culture and arts; (c) biophilia and biophilic design of the built environment; (d) emerging industries; (e) parents, teachers and administrators; (f) humanistic and spirituality, upon which this approach may evolve. (Melancona & Hendry, 2015) In contrast, integrated schooling would change this way of thinking, would prevent history from repeating itself in yet another civil war, and would heal these divisions to create one, unified, American nation. Integration was the only way to ensure that all Americans, both blacks and whites, had access to an equal education.

Literally, holistic learning is defined as learning which maximize all aspects in students. In addition, integrated curriculum is curriculum which combine several disciplines through integration of content, skill and attitude (Wolfinger, 1994). The rational of that integration among others are caused by the following:

1. Many problems and experiences (including learning experience) is interdisciplinary, so it needs multi-skill to understand, learn and solve them.

2. There is demand for high collaborative interaction in solving various problems.
3. Ease children to make relation among schemata and transfer among context.
4. Efficiency.
5. There is demand for children's high involvement in learning process.

The activity in holistic education is to determine the goal to build holistic human, should use holistic education concept, as mentioned in *Education 2000: A Holistic Perspective* agreement. The essence of that agreement is how educational system can:

1. Teach students about awareness that each aspect in life is interconnected so they can live the life productively, peaceful, and continuously because each individual's action will effect on his/her environment.
2. Educate all aspects of human dimension.
3. Appreciate that each human has his/her strength.
4. Educate to think holistically, which comprise intuition, context, creativity and physical aspect.
5. Give conducive learning environment, because learning is an active process which is intrinsically motivated, support and excite human spirit.
6. Use holistic curriculum (interdisciplinary) which integrates community with global perspective.

From some explanations mentioned above, it can be concluded that integrated and holistic education is education which give learning experience which ease students in learning because it integrates multi disciplines and also educate all aspects in students. This advantage is used give new experience which can maximize self potency particularly 'the soul' in students which make students to become better individual.

Before discussing deeply about evaluation, according to (Stufflebeam & Shinkfield, 2007) state as follow: Evaluation is the systematic assessment of the worth of merit of an object. Evaluation's roof term, value, denotes, that evaluations essentially involve making value judgment. Accordingly, evaluations are not free. They need to be grounded in some defensible, set of guiding principles of ideals and should determine that evaluands standing against these values. Furthermore, Stufflebeam complete definition of evaluation as follow: Evaluation is the systematic assessment of an object's merit, worth, probity. feasibility, safety, significance and or equity. It see the values referenced in this definition as particularly important in a free and democratic society; but also acknowledge that might have included additional values. While according to (Yarbrough, Shulha, Hopson, & Caruthers, 2011), define evaluation as 'evaluation is systematic investigation of the value, importance, or significance of something of someone defined along dimensions.' So evaluation become one important component in a program. From the three definitions above

(Stufflebeam & Shinkfield, 2007), (Yarbrough et al., 2011) it can be concluded that program is value consideration, systematic assessment and one important component in a program.

Whereas the definition of program in general is understood as a plan. (Arikunto, 2010) assert that the definition of program is as follow: Program is an unit of activity which is a system, namely the activity done not only once but continuously. Program involve a group of people in an organization. Next, (McDavid & Hawthorn, 2006) defines program as follow: Program defined as a group of related activities that is intended to achieve one or several objectives. Programs are means-ends relationship that are designed and implemented purposively. They can vary a great deal in scale. Furthermore, (Owen, 2006) defines program as follow: Program is an intentional effort at change in which, in addition to its effect on participants, may have secondary effect on the context, within which the program is located, for example, an organization or more diverse socio-cultural setting. Refer to the three definitions above, it can be understood that program is interconnected activity in organization. The outcome of program implementation for each unit also should follow the prevailed system in that organization. The implementation of program will effect on participants, so it can be implemented purposively. Such steps are done to achieve several objectives of program evaluation, so it should be initiated by discussion about the definition of evaluation according to the experts. In general, the definition of evaluation is understood as an activity to gather information in order to determine a policy for the next program to follow-up. According to (Steele, 2010) defines program evaluation as follow: Program evaluation is a process of judging (or a judgment as to) the worth of value of a program. This judgment is formed by comparing evidence as to what the program is with the criteria as to what the program should be.

The above definition give description that there are three important points in evaluation activity namely: judging, collecting evidences and deciding the result.

Meanwhile, (Rossy, Lipsey, & Freeman, 2006) define program evaluation as follow: Program evaluation is the use of social research methods to systematically investigate the effectiveness of social intervention programs in ways that are adapted to their political and organizational environments and designed to inform social action in way to improve conditions.

Meanwhile, (Wirawan, 2016b) say. In education, program evaluation refers to the sets of activities involved in collecting information about the operation and effects of policies, program, curriculum, sources and educational software and other instructional materials.

Based on the experts' opinion above, it can be understood that evaluation investigate systematically a program and regulate and gather information about a program (Steele, 2010) (Rossy et al., 2006) (Wirawan,

2016b) Discrepancy Evaluation Model is developed by Malcolm Provus Model. This evaluation emphasize the discrepancy in program implementation. Evaluator describe the discrepancy between performance standard with real performance which had been implemented (Arikunto, 2010). As for the stages which should be implemented in discrepancy evaluation model according to (Wirawan, 2016a) are: 1) Plan evaluation by using discrepancy model, determine the informant needed to compare the real implementation with standard which define the performance of object evaluation, 2) Asses the performance of evaluation object which comprise program implementation, quantitative and qualitative results, 3) Identify the discrepancy between implementation standard with the implementation result of real evaluation object and determine the gap ratio, 4) Determine the discrepancy by making changes toward implementation of evaluation object.

(Provus, 1971) discrepancy model evaluation has the stages of development as follow: 1. Design and refer to the nature of program, its objective, students, staff and other resources required for the program, and the actual activities designed to promote attainment of the objectives. The program design that emerges becomes the standard against which the program is compared in the next stage, design that emerges becomes determining whether an implemented program is congruent with its implementation plan, 2. Process, in which evaluator serves in a formative role, comparing performance with standards and focusing on the extent to which the interim or enabling objectives have been achieved, 3. Product is concerned with comparing actual attainment against the standards (objectives) derived during stage 1 and noting the discrepancy (Clare Rose & Glenn F. Nyre, 1977:15).

Based on some opinions above about the definition and component of stages in implementing evaluation by using Discrepancy Model, then it can be understood that discrepancy evaluation model is the type of evaluation model done by measuring or describing between standard used with real condition in implementing a program. The component which should be noticed or become procedure in implementing Discrepancy Model according to Provus (in (Wirawan, 2016a)) comprise the stages as follow: 1) Design is the stage of activity to formulate goal, process, and allocation of resource in doing activities to achieve the determined goal, 2) Installation is design used as standard in order to consider the steps in program operational, 3) Process is evaluation activity centered to the effort to obtain data about the progress of program, in order to determine whether program had been in accord with the expected goal, 4) Product is evaluation to determine whether the goal of program had been achieved, 5) Cost and benefit analysis is analyze the outcome obtained compared with the cost expended.

The evaluation model which will be used in this study is Discrepancy Evaluation Model (DEM). Evaluation is

focused to find out the discrepancy or mismatch between implementation of IHES model program with IHES model designed by school. Knowing this discrepancy can give input to improve the implementation of IHES model program in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java.

This study cannot be separated from earlier study conducted by (Forbes, 2003) The authors certainly saw these procedures as interdependent, often as two faces of the same coin. While each author (and many forms of holistic education) has slightly different versions of these procedures, they generally have the following characteristics in common:

1. The exercise of good judgment.
2. The ability to be free.
3. The ability to discover and refine values.
4. Meta-learning.
5. Social-ability.

According to (Rathnam, 2013) in his journal *Whole Teachers: A Holistic Education Perspective on Krishnamurti's Educational*: (Forbes, 2003) analyzed the life of six individuals who are generally considered to have laid the foundations of holistic education: (Rathnam, 2013), Forbes states that these six founding fathers of holistic education felt that teachers' self-development, which revolved around the development of virtues, morals and religiousness to be – an essential element in the students' education (p.45). Forbes's notion of religiousness can also be defined as spirituality. Four participants (teachers) were interviewed from Oak Grove School, and alternative, holistic school founded by Krisnamurti in 1974. This inquiry probed into teachers' thinking, teachers' lives, teachers' inner lives, teachers' contemplative practices, teachers' calling/vacation and teachers' pedagogy. Findings of this inquiry reveal the awareness that exist among the participants with regards to their understanding of Krisnamurti's educational philosophy and the way in which this philosophy has shaped their Krisnamurti's philosophy has certainly had an impact on the participant's wholeness, Krisnamurti was never interested in imposing his philosophy on the teachers to think in a narrow groove. Rather, he challenged them to arrive at wholeness or a holistic approach toward living by their own volition, by putting aside all philosophy, including his own. The research points toward the possible ways in which wholeness can be developed using: innate wisdom (teachers' inner life, teachers' calling); wisdom gained through experiencing life (teachers' life, teachers' thinking); wisdom gained through their teaching experience (teachers' pedagogy) and wisdom gained through practices that bring harmony to the mind, body and spirit (teachers' contemplative approaches).

This study is qualitative descriptive with Discrepancy Evaluation Model. It because this study try to do evaluation activity and describe study data in the form of explanation and statement about implementation of IHES model in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java toward IHES model itself. This study was conducted in Gema Nurani Integrated and Holistic Islamic Elementary School, Bekasi, West Java, address in Jl. Raya Kaliabang Tengah No.75B, Kaliabang Tengah, North Bekasi, Bekasi City, West Java 17125. Whereas, this study was conducted in February 2016 until March 2018.

Data collection technique used in this study comprise: 1) In-depth interview with The Head of Yayasan, Headmaster, teachers, staffs, students, students' parent, and alumni. 2) Observation to obtain information about activity process done based on IHES model consisting of plan activity, teaching and learning activity, religious activity, parents meeting. 3) Documentary study to obtain information of program implementation comprising IHES model, curriculum, RPP, detail of registration fee and tuition, infrastructure, data on students and students' parent. 4) Focus Group Discussion to validate data obtained based on interview, observation and documentary study.

The stages in doing data analysis in this study comprise: 1) Data collection, 2) Data reduction, 3) Data display, 4) Verification/ Conclusion. In stage of data collection, data was obtained from sources through interview, observation and documentary study. After collecting data, data reduction and data sorting was done in accord with its own category based on Discrepancy model comprising program design, installation, process and outcome. After data was reduced and sorted based on its category, the next stage is data display which arrange and present data, then conclusion was drawn or verification.

Data validity test was used in this study by using source triangulation technique. In this study, source triangulation was done by validating data obtained through interview, observation and documentary study through Focus Group Discussion activity. FGD activity will result in data on validated study result as material to hold discussion in evaluation research activity, through discussion result which present resource persons or informants including The Head of Yayasan, Headmaster, teachers, staffs, students, students' parent, and alumni.

2.1. Paper Title

The Evaluation Of Integrated And Holistic Education System (IHES) Program In Gema Nurani Integrated Islamic Elementary School, Bekasi, West Java.

Based on (Shi, 2015) research on integrated education model in college English teaching, Qinhuangdao Institute of Technology by making the scheme as follow:

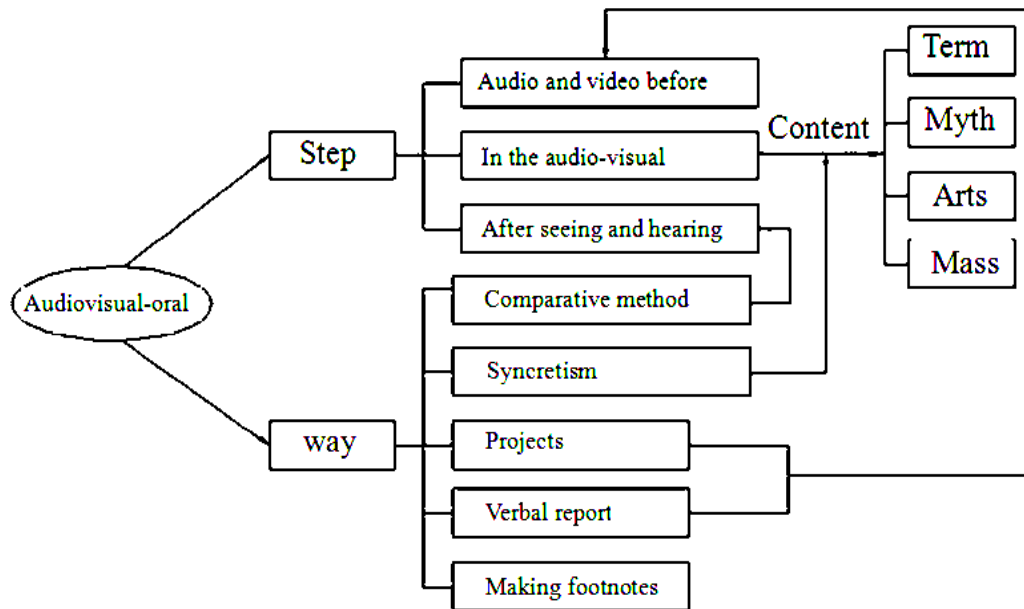


Figure 1. Integrated Education

Based on the scheme above:

1. Oral-audiovisual enter the part of step, namely:
 - a. Audio and video before
 - b. In audio-visual, the content consist of:
 - 1) Term
 - 2) Myth
 - 3) Art
 - 4) Mass
2. Way consist of several steps:
 - a. Comparison method
 - b. After seeing and hearing
 - c. Synchronization
 - d. Project
 - e. Verbal report
 - f. Making footnotes

According to the study above, that integrated and holistic education enable students to optimize all aspects in them particularly in learning which integrate all aspects started from audio, visual, art an also making footnote. Based on the study result above, integrated and holistic education is seen, in which teacher put aside their personal interest for their students and implement learning by using audio-visual and make footnote to synchronize learning in class. Each IHES model certainly has consequence in its

application. However, if implementation of integrated and holistic education run maximally, it enable students to be good in academic, attitude and Islam religion tenets. The implementation of IHES model in Gema Nurani Islamic School, Bekasi, West Java has produced the graduates accepted in Public Junior High School because knowing the quality of earlier school. Not only excellent in academic but the graduates also excellent in Islam religion tenets because at least they memorize juz 30 in Quran. Besides, they grow the attitude to love Quran and slowly shape students' character to become better in accord with Islam religion tenets.

To implement that evaluation activity, it use an evaluation model with design to compare the implementation of program in field with established standard, namely by using discrepancy evaluation model. The discrepancy evaluation model gather information through the stages of component which comprise: 1) Design, 2) Installation, 3) Process, 4) Product and, 5) Cost and Benefit Analysis. Through that evaluation activity, it is expected that it will give an outcome which capable to see to what extent the achievement of IHES model implementation in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java, and give follow-up of next policy to that program.

Table 1. Comparison between conventional education system and IHES

Conventional Education System	Integrated and Holistic Education System (IHES)
<ul style="list-style-type: none"> • Focus is based on <u>learning</u>. • Based on age • Teaching and learning process is conventional • Concentration on career development • Educational program is discrete and separated. • Secular program in moral and civic awareness • Partial human development program • Partial and compartmented curriculum development 	<ul style="list-style-type: none"> • Focus on learning outcome: <ul style="list-style-type: none"> - Immersion and knowledge - Character building (Akhlaq) - Academic achievement - Application in life • Grade promotion depend on potency not age. • Development program is based on tarbiyah process <ul style="list-style-type: none"> - Learning and teaching - Building process - Training process - Advising process - Consultation process • Educational model is based on whole human development in life and career system development. • A continuous educational program with Qurani generation, nurturance development program, preschool, elementary school, secondary school, high school, and alumni. • Tarbiyah, daily tazkiah, weekly usrah, monthly qiyamulail, tamrin for each semester programs, annually mukhoyyam program. • Development of whole human potency, intellectual, emotional, religious, physical programs. • Integrated and holistic curriculum development program in a whole <ul style="list-style-type: none"> - National Curriculum - International Curriculum - Coordination Curriculum - Extra Curriculum - Core Curriculum based on Quran and Sunah.
<ul style="list-style-type: none"> • The numbers of students, ratio of teacher and student is 1:40 • Partial assessment with conventional children program 	<ul style="list-style-type: none"> • The numbers in small class, ratio of teacher and students is 1:20. • Continuous assessment process with special program for children in general, special children, and gifted children. • Continuous development and assessment both in academic intelligence and character building.

The analysis of review and result study in the aspect of design gives a perspective that in implementing IHES model program needs to give attention to the needs and goal which will be achieved. It should become one important foundation to operate a program. The review of this study result substantially had been tried to elaborate and collect information about that IHES model program. After the background and goal of program is determined, the aspect of plan become next step. It also expressed by Usman (2013) that in aspect of planning a program needs to decide the activity. Through that condition, it needs a foundation or background in running a program.

Based on result study and experts' opinion, it can be concluded that implementation of IHES model program

had fulfilled the design component comprising background and goal, and standard in implementing IHES model program.

Installation of IHES model program implementation

The aspect of installation in implementing IHES model program in Gema Nurani Islamic School, Bekasi, West Java is mentioned in four standard components of IHES model implementation standard which has been set by Yayasan Asasi Indonesia.

The study result showed that the aspect of installation in implementation of IHES model program in Gema Nurani Integrated Islamic School, Bekasi, West Java has been completed by four (4) component standard as follow: 1)

Material Mastery, 2) Learning Media, 3) Fund Arrangement, 4) Arrangement and Determination. This result study give description that in implementation of IHES model program had been refer to established standard in IHES model program.

Similarly, Usman (2013) say that the determination of standard in a plan needs to rely on standard in order to consider effectiveness and efficiency, and oriented to the future. Therefore, from the rule aspect of implementing production and service unit program had referred to five standard components established by government.

This study result is in accord with the study conducted by (Widyastono, 2012) that implementation of holistic education in elementary school and secondary school level had been in accorded with used standard. Based on the study result, the experts' opinion and earlier study result, then it can be concluded that in aspect of installation in implementing IHES model program had fulfilled the standard in running the program.

Implementation of standard component of IHES program model in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java emphasize the activities of Material Mastery, Learning Media, Fund Arrangement, Arrangement and Establishment of using infrastructure. The study result finding showed that the aspect of process in implementing IHES model program had not in accorded with standard component of the established program and arrangement and decision in using infrastructure.

In the aspect of program component standard, that implementation of IHES model program from management aspect, Human Resource and infrastructure arrangement has not been managed well. It showed in the result of FGD (Focus Group Discussion) conveyed by teachers as follow:

“learning depends on its material, if learning specifically take place in Science Laboratory and also in places surrounding school (fish pool, yard and trees), while for learning Bahasa now has not done in Language Laboratory because there is still reparation inside. (FGD result, 12 February 2019).

That result give description that the aspect of determine infrastructure usage had not been scheduled. Similarly, FGD result also conveyed by Headmaster as follow:

“IHES curriculum here is still refined, one of them is about the lack of facility in which Nature Laboratory is not available because in IHES mention the room (the yard which contain animals and plants). Nature and technology will be taught in Science Laboratory (INDRA SETIAWAN, 2018)

Based on FGD result and interview with Headmaster and teachers above, then implementation of IHES model program in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java had not implemented the standard for running the program.

The aspect in outcome evaluation in implementation of IHES model program in Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java, refer to

achieving the aim of IHES model program implementation. Based in the study result which state that in aspect of outcome in implementation of IHES model program that program had been in accorded with predetermined aim. It is showed one of them by some subjects which has been integrated with Islam religion tenets. The subjects in school not only learn religion (Islam), but national education by using local curriculum in school can be balanced. IHES comprise national education program, for example: RPP from national education added with IHES (Science is related to the verses of Quran). So students understand that everything learned has been arranged by Allah SWT (interview with classroom teacher, 2019). The finding of study showed that achievement of outcome evaluation is measured through achievement of predetermined aim. Therefore, in plan management concept to run the program of production and service unit has been in accorded with the aim in operating the program. Similarly, Husaini (2013) state that to achieve the aim, then there should be a plan in operating the program.

In addition, the realization in achieving maximal outcome also seen from collaboration activity between Gema Nurani Integrated and Holistic Islamic Elementary School, Bekasi, West Java with ADNY School, Malaysia as the pioneer of IHES model program, Integrated Islamic School Kota Damansara (IISKD) Malaysia, Madrasah Al Islamiyah Al Junied Singapore, Integrated and Assessment Board (IHAB) Malaysia, Centre for International Examination (CIE) of Al-Azhar University, Indonesia, Perguruan Ar Rafi Bandung, and active in educational movement in JSIT Indonesia. In addition, Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java also continuously conduct IHES training in ADNY School, Malaysia. Gema Nurani also collaborate with SMP Islam Terpadu Gema Nurani, Bekasi, West Java if SDIT graduates want to enter higher level school.

Through that collaboration activity, the goal of operating the program in aspect of collaboration with another school had been fulfilled. With collaboration between Gema Nurani Integrated and Holistic Islamic School, Bekasi, West Java with another school, then it can improve the implementation of IHES model program indirectly and also collaboration with another school. Based on the study result, it can be concluded that in aspect of outcome for implementing IHES model program, Gema Nurani Islamic School had been in accorded with predetermined aim.

The aspect of cost and benefit analysis in implementing IHES model program viewed from the outcome gained and cost expended for teaching and learning activity had not been in accorded with standard used in operating the program. It is seen from capital source used in implementation of IHES model program. Based on data from researcher that capital source generated from three (3) sources namely registration fee, school tuition and School Operational Cost fund. It also through the result of FGD by Headmaster, teachers, students' parent and staff that “every

the date of 10 students should pay school tuition and there is dispensation for now. As for teachers' son or daughter there is dispensation and I would like to say thank. The amount is vary depends on teaching experience in school and the tenure. The informant 2: for registration (in the beginning of year) can be paid 2 x for semester 1 and semester 2, and for school tuition can be paid in the date of 10 for each month. Thus, so far teaching and learning activity run well, similarly with incentive for teachers, staff, office boy (OB) and security guard run well without obstacle.

Through that result study, it needs plan and financial management and production which are worth to be considered in operating that program. Concerning financial resource management, Handoko (2003) say that financial management is important thing in implementing the function of management.

From the aspect of benefit, the quality of graduates shows enhancement of mean score in national school exam about 5% for Bahasa Indonesia subject, 4% for Math subject, and 5% for Science subject. Based on the study result above, then it can be concluded that in aspect of cost and benefit analysis, the implementation of IHES model in SDIT Gema Nurani, Bekasi, West Java, has been in accorded with standard and expectation.

3. Conclusions

Based on study result and discussion above, it can be concluded that:

1. The aspect of Design in implementation of IHES model in SDIT Gema Nurani, Bekasi, West Java based on background of program implementation and it is in accordance with IHES model program in SDIT Gema Nurani, Bekasi, West Java.
2. The aspect of Installation in implementation of IHES model in SDIT Gema Nurani, Bekasi, West Java has been completed by the standard of IHES model program in SDIT Gema Nurani, Bekasi, West Java which consist of standard components: 1) Material mastery, 2) Learning media, 3) Fund arrangement, 4) Arrangement and Determination of using infrastructure.
3. The aspect of Process in implementation of IHES model in SDIT Gema Nurani, Bekasi, West Java has not been in accordance with predetermined standard particularly in program standard component of teacher and staff' attitude, and infrastructure.
4. The aspect of Outcome in implementation of IHES model in SDIT Gema Nurani, Bekasi, West Java has been in accordance with established standard.
5. The aspect of Cost and Benefit Analysis in implementation of IHES model in SDIT Gema Nurani, Bekasi, West Java had been in accordance with established standard.

Acknowledgements

By uttering as high praise as the thankfulness of the presence of God Almighty, for all His grace and gifts to researchers, finally the researcher can complete the research entitled "The Evaluation Of Integrated And Holistic Education System (IHES) Program In Gema Nurani Integrated Islamic Elementary School, Bekasi, West Java, Indonesia.

The researcher realized that this research could be completed thanks to the support and assistance from various parties. Therefore, the researcher thanked all parties who directly or indirectly contributed to the completion of this research. In particular, the researcher expressed his gratitude to:

1. Prof. Dr. R. Madhakomala, M.Pd., As the Promotor of Universitas Negeri Jakarta (UNJ)
2. Prof. Dr. Bedjo Sujanto, M.Pd., as Co. Promotor, Universitas Negeri Jakarta (UNJ)
3. To Mr. Abdul Halim and Mrs. Wagiyatun, S.Pd., as parents, the researchers expressed their respect and gratitude that they always prayed for, provided support for the success and safety of researchers over the years.
4. The beloved Indri Dwi Astuti and Indra Kadarusman as the younger siblings and Andra Pratama Kadarusman and the late Almarhum Azka Afgansyah Kadarusman as nieces and nephews, the researchers offered love that always prayed for, provided moral and material support for the success and safety of researchers over the years.

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Examining the Relationship between Creativity and Critical Thinking through Integrated Problem-based Learning and Digital Mind Maps

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract Critical thinking is a complex process which requires higher-order thinking to achieve the expected outcome, while creativity is strongly associated with the production of useful and unique ideas. Both creativity and critical thinking involve new perspectives which can be empowered through the implementation of integrated Problem-based Learning (PBL) and Digital Mind Maps (DMM). The present study attempted to examine the relationship between critical thinking and creativity through the implementation of the combined PBL and DMM learning model in Human Physiology and Anatomy classes. This study employed a quasi-experimental design which involved students from the Department of Biology Education, Universitas Islam Riau, Indonesia. Every aspect of the participants' critical thinking and creativity was measured using an essay test. To reveal the relationship between critical thinking and creativity, a regression analysis was performed. The results showed that there was a significant relationship between critical thinking and creativity ($Y = 35.439 + 0.485x$). It, thus, can be concluded that the Integrated PBL and DMM model can be used as an alternative approach for simultaneous empowerment of students' critical thinking and creativity

Keywords Critical Thinking, Creativity, Integrated PBL-DMM

(Kaufman, Quilty, Grazioplene, Hirsh, Peterson, & DeYoung, 2016; Sternberg, 2006). Creativity can also be associated with discovering a fresh and original solution to one existing problem (Cropley, 2001) or producing new problem-solving ideas (Duff, Kurczek, Rubin, Cohen & Tranel, 2013; Crilly, 2015; Lewis, 2005; Smith, 2014). Creativity, thus, can help someone deal with unexpected difficult circumstances. Creativity normally emerges during the process of finding advanced solutions (Cropley, 2001; Plucker, Beghetto, & Dow, 2004; Reiter-Palmon, Illies, Cross, Buboltz & Nimps, 2009) to complex social issues (Crilly, 2015).

Creativity is affected by problems identification and definition (Mumford, 2003). Creative people are sensitive to the existence of problems. They believe that without problems, individuals have little chance to show their creative traits (Kaufman et al., 2016). Runco & Jaeger (2012) emphasizes that creativity is very helpful for solving problems. Lemon (2011) also notes that recognizing, discovering, and being aware of problems to find solutions are the characteristics of creativity. In the process of finding new solutions to problems, critical thinking is needed so that it can be said that creativity also includes cognitive activities such as critical thinking (Feldhusen & Goh, 1995).

Critical thinking is a complex process that requires high-level reasoning to achieve desired results (Almeida & Franco, 2011; Halpern, 2006). Different skills are involved in critical thinking. Critical thinkers constantly question the source of knowledge information, test the validity of the information, analyze the reliability of the information, and therefore are able to provide precise explanations on specific tasks or situations (Bruine, Fischhoff, & Parker, 2007; Halpern, 2014; Hong & Choi, 2015). Critical

1. Introduction

Creativity can be defined in a few ways through cognitive processes, personality traits, environment variables, and an interaction between these components

thinking can be considered as a multidimensional cognitive construction that implies the interaction between inductive and deductive reasoning and creative processes in different phases of problem-solving (Linn, 2000; Philley, 2005). In this way, critical thinking consists of cognitive, dispositional, motivational, behavioral, and metacognitive functions (Miele & Wigfield, 2014).

In general, creativity and critical thinking include new perspectives, rather than being bound by rules or just looking for something ordinary and not genuine. They cannot be separated completely or considered as two different things. They sometimes complement each other (Spuzi et al., 2016) because the creative process is likely to involve several aspects of critical thinking (Villalba, 2017). Analysis, judgment, logical decision making and problem-solving are needed for critical thinking while creativity produces original ideas and finds new solutions. The way someone looks at a problem from different perspectives can affect his/her creativity (Vernon & Hocking, 2014).

The tendency of being creative is to produce original ideas, views, and perspectives to solve problems, while critical thinking puts more focus on generating logical ideas, views and perspectives to solve problems. Yang & Lin (2004) explain that critical thinking involves not only logic but also creative aspects. In fact, creative and critical thinking develop simultaneously (Chang, Bei-DiLi, Chen, & Chiu, 2015). On the other hand, Spuzic et al. (2016) argue that sometimes creativity and critical thinking can be regarded as two completely opposite elements. Creativity is related to divergent ways of thinking while critical thinking is related to convergent ways of thinking. At the stage where creativity needs to exist, critical thinking can become an inhibitory factor that reduces creativity because, in the creative process, a large number of ideas are needed. The interference of critical thinking may lead to decreasing the effectiveness of this divergent way of thinking because critical thinking emphasizes more on narrowing ideas and sharpening analysis.

Critical thinking and creativity are important for university students. Critical thinking can help learners make decisions (Butler, Pentoney & Bong, 2017), adapt to changes (Alper, 2010), and provide benefits for the community (Dwyer, 2017). Creativity plays a crucial role in producing imaginative thinkers (Yates & Twigg, 2017) who are able to create innovations in various fields (Kuo, Burnard, McLellan, Cheng, & Wu, 2017). Due to their importance, critical thinking and creativity should be empowered in the classroom by doing appropriate learning practices (Leggett, 2017), such as implementing active learning, known as Integrated PBLDMM (Integrated Problem-Based Learning and Digital Mind Maps).

Problem-based Learning (PBL) is an active learning model that uses problems as a stimulus. It facilitates student-centered learning where teachers play an important role as a facilitator. The problem-based learning process is carried out in groups and new information is obtained

through independent learning (Barrow, Lyte, & Butterworth, 2002; O'Grady et al., 2012). As an active learning model, PBL has been shown to be able to increase critical thinking (Kek & Huijser, 2011; Mahmoud & Mohamed, 2017) and creativity (Ulger, 2018; Zhou, 2015). PBL can be integrated with digital mind maps (DMM). Mind maps can be combined with active learning models. This integration can increase high order thinking (Zubaidah, Fuad, Mahanal, & Suarsini, 2017). The integrated PBLDMM model helps students represent ideas using high-level thinking skills (Faste & Lin, 2012). This learning model is expected to increase students' critical thinking and creativity.

The introduction provides an explanation of the importance of knowing the relationship between critical thinking and creativity. Some experts claim the complementary nature of critical thinking and creativity, while some others argue that critical thinking and creativity are completely opposite. Based on this explanation, the study aimed to examine the relationship between critical thinking and creativity in Integrated PBLDMM model.

2. Literature Review

2.1. Critical Thinking

The concept of critical thinking has been widely used in various fields so that there are many definitions of critical thinking. Critical thinking is the ability to think rationally and reflectively. Thus, it helps individuals decide on what to believe or do (Ennis, 2011) through intellectual processes in conceptualizing, applying, analyzing, synthesizing, and evaluating information (Scriven, 2003). Critical thinking involves high-level cognitive skills such as conceptualization, analysis, and evaluation. In addition, critical thinking is also related to an intellectually open attitude that leads to logical and appropriate actions (Papp et al., 2014).

Critical thinking is a transferable skill that can be learned independently. An appropriate curriculum and teaching method can accommodate the development of students' critical thinking (Kim, 2009). Moreover, critical thinking can be set as a learning objective so that students learn to apply their cognitive skills (Dell'Olio & Donk, 2007). The cognitive approach emphasizes the importance of mental processes in learning while paying attention to the surrounding environment (Schunk, 2008). This cognitive process can express concerns about developing key elements of students' thinking abilities such as analysis, induction, and evaluation (Adler, 2000).

Critical thinking is needed in everyday life (Ornstein, Pajak, & Ornstein, 2011) as it can encourage a right and directed decision making, form opinions based on logical reasons, provide confidence in maintaining conclusions about what to do and receive correctly (Bassham, Irwin,

Nardone, & Wallace, 2011). The importance of critical thinking is also related to the actions taken. Critical thinking requires that we recognize assumptions that constitute the basis of our beliefs and behavior. In other words, we can provide justification for the ideas and conducts that we perform (Spuzic et al., 2016).

2.2. Creativity

Creativity can be defined in various ways, which involve cognitive processes, personality characteristics, and environment variables, as well as interactions between these components (Kaufman et al., 2008; Sternberg, 2006), related to the originality, novelty, and usability of ideas (Beghetto, Dow, & Plucker, 2004; Runco & Garrett, 2012). Creativity deals with divergent thinking that involves the interaction between abilities and processes when a person or a group of people produces a new and useful outcome or product (Leggett, 2017) based on one's knowledge, motivation, emotions, and experience (Runco & Jaeger, 2012). The process of producing something new in creativity is driven by curiosity through the exploration to identify problems, observation, and investigation to find out how the creative predecessors invented breakthroughs (Starko, 2013).

The important role of creativity in the success of students has been reported by scholars (Butler et al., 2012; Runco et al., 2010). Creativity influences a person's success in the future (Castillo-vergara et al., 2018). Creativity equips someone with the ability to create innovations in various fields (Kuo, Burnard, McLellan, Cheng, & Wu, 2017). Creativity is more than just a cognitive function because it occurs in a system with the involvement of many parties such as students' interaction with educators, peers, and other people and with other things or ideas (Jackson, 2016).

2.3. The Integrated PBLDMM Model

Problem-based Learning (PBL) is a learning model that facilitates group learning by providing a complex and meaningful set of problems for students so that they are able to gain scientific knowledge by solving these problems (Arends, 2012; Savery 2006). The problems raised are in accordance with real-life situations so as to encourage students to learn passionately and use inquiry-based learning skills (EL-Shaer & Gaber, 2014; Carriger, 2015). In general, the learning process that takes place in a PBL classroom is formulating problems, finding references to solve the problems and conveying or reporting findings/solutions to the problems (Arends, 2012; Loyens, Kirschner, & Paas, 2012).

The combination of PBL and Digital Mind Maps (DMM) can boost students' active participation. It also accommodates creative problem-solving (Noonan, 2013). Students are better prepared to face learning because they already have material provisions when compiling the DMM (Jbeili, 2013). DMM are created using a

technology-based application. DMM help students compose their ideas (Faste & Lin, 2012). The main idea is usually put in the middle and there are several branches of the map used to describe the details (Simonova, 2015). Images or videos can be added to the DMM to facilitate understanding (Papushina, Maksimenkova, & Kolomiets, 2017).

3. Methodology

3.1. Research Design

This correlational study was conducted to examine the relationship between creativity and creative thinking through the implementation of Integrated Problem-Based Learning and Digital Mind Maps (Integrated PBLDMM). The stages of learning consisted of (1) students organized DMM to connect concepts, (2) students were introduced to problems, (3) students were organized to learn, (4) students were guided to learn as an individual and as a group member, (5) students were asked to present the results of the group discussion, (6) students were asked to do reflection and evaluation on learning. The stages of learning were performed to students from the Department of Biology who were studying Human Anatomy and Physiology.

3.2. Research Instruments

The instrument used to measure students' creativity was an essay test provided with an assessment rubric adapted from Greenstein (2012). The indicators of creativity measured were originality, elaboration, fluency, flexibility, risk-taking. The validity and reliability of the test had been confirmed beforehand and the results showed that the test was valid and reliable (0.84). In a similar way, another essay test was developed to examine the students' critical thinking. The test measured six aspects of critical thinking suggested by Ennis (2011) that are basic clarification, bases for a decision, inference, advanced clarification, supposition and integration, strategies and tactic. A validity test was performed and the result showed that the critical thinking test was valid and reliable (0.75).

3.3. Data Collection and Data Analysis

Data on the students' creativity and critical thinking data were collected by calculating the test scores. Before conducting the correlational analysis, the normality and homogeneity of the data were tested. The results showed that the critical thinking data were distributed normally (p -value of 0.200 and 0.097) and homogeneous (p -value of 0.177 and 0.055). Data on the students' creativity also had normal distribution (0.079 and 0.00) and were homogeneous (0.658 and 0.300). To see whether there was a significant correlation between creativity and critical thinking, Pearson Product Moment Coefficient of

Correlation and analysis of regression were run. The relationship between the two variables was also analyzed descriptively.

4. Results and Findings

The results of the regression analysis on the relationship between critical thinking and creativity are presented in Table 1.

Table 1. The Results of the Regression Analysis

Model	Non-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	35.439	8.003		4.428	.000
Posttest critical thinking	.485	.137	.526	3.551	.001

a. Dependent Variable: Creative thinking Post-test

Table 1 shows a constant value of 35.439 for creativity and 0.485 for critical thinking, hence the linear function that can depict the relationship between these two variables is:

$$Y = 35.439 + 0.485x$$

The functional form describes that creativity increases 0.485 with each additional point of critical thinking. Then, it can be interpreted that the improvement of students' critical thinking is followed by the development of their creativity.

To find out the significance of each regression coefficient, the t-test was carried out with a level of accuracy (α) of 5%. The results of the t-test calculation can be seen in Table 1 in the right column. Based on Table 1, it is known that the regression equation is significant with $p\text{-value} = 0.001 < \alpha$ ($\alpha = 0.05$) and a coefficient of 0.485. A clearer distribution for each variable is presented in Figure 1.

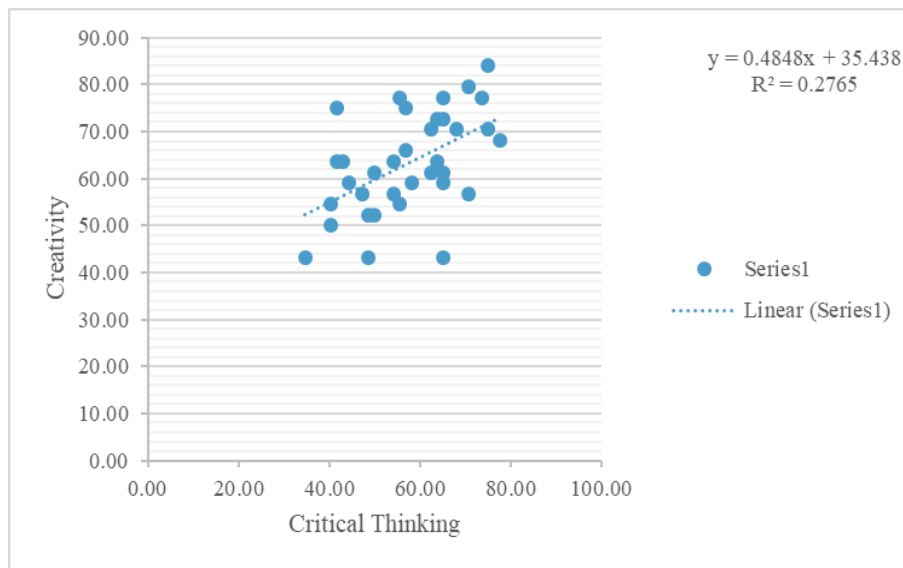


Figure 1. A Simple Linear Regression Plot

Table 2. The Results of the F-test

Model	Sum of Squares	Mean Square	F	Sig.
1 Regression	1077.068	1077.068	12.608	.001 ^b
Residual	2818.998	85.424		
Total	3896.065			

a. Dependent Variable: Post-test creativity
 b. Predictor: (Constant), Post-test critical thinking

The correlation between the independent variable and dependent variable was examined using F-test with a level of accuracy (α) of 5%. The results of the F-test are presented in Table 2.

Table 2 shows that the relationship between critical thinking and creativity is significant, with $F_{\text{calculated}} = 12.608$ and $p\text{-value} = 0.001 < \alpha$ ($\alpha = 0.05$). In other words, the linear regression function can be used to predict students' creativity scores.

The results of the analyses that have been presented earlier show that students' critical thinking increases as their creativity increases. The simultaneous development of the two variables may be facilitated by the Integrated PBLDMM used in the learning process. The first stage of PBLDMM which is the organization of digital mind maps (DMM) encourages students to read the material before coming to the classroom. It allows students to keep all important concepts in the DMM. During this process, students are allowed to improve their critical thinking by searching for important information from various references and sorting the information into the digital mind maps. In the process of creating an interesting and understandable digital mind map, creativity is required. Students need to be careful in choosing appropriate images that can represent concepts. This task entails thinking rather than just information memorization (Papushina et al., 2017). Paradice et al (2000) also add that critical thinking and creativity can form a single process where students are able to produce more ideas and filter information to make the right decision.

The results of this study are also in line with Villalba (2017) and Lipman (2003) who argue that creative solutions can be generated through evaluation stages that require critical thinking. On the other hand, Halpern (2006)

explains that even though critical thinking and creativity can complement each other, they can be developed separately using varied learning strategies. However, this study has revealed that Integrated Problem-based Learning and Digital Mind Maps (PBLDMM) is able to improve students' critical thinking and creativity at once.

The relationship between critical thinking and creativity can also be inferred from the answers given by students while working on the critical thinking and creativity tests (Figure 2). In the critical thinking test, one student explained that hemodialysis can cause anemia and osteoporosis. The same student, in the creativity test, wrote that kidney transplant was a better solution for patients with kidney failure rather than hemodialysis. Students who were able to do the critical thinking test was also able to complete the creativity test perfectly. This shows that a critical thinker can make a logical connection between ideas derived from creativity (Marrapodi, 2003).

There is a significant correlation between critical thinking and creativity because creativity contains the elements of critical thinking. These two variables support each other. Critical thinking is used in evaluation and creativity is used in information synthesis. The evaluation focuses on making judgments based on statement analysis while synthesis concentrates on integrating parts and relationships in a new and original way (Huitt, 2003; Fairweather & Cramond, 2010). One of the aspects of critical thinking is bases for a decision. The finding of this study suggests that students are able to make a better decision when they have various ideas or in other words when they possess creativity. It, thus, can be concluded that students' creativity can provide a basis for their creative thinking.

Seorang pasien gagal ginjal menjalani cuci darah di sebuah rumah sakit. Setelah bertahun-tahun menjalani cuci darah, ia mendapat kabar bahwa gagal ginjal dapat ditolong dengan transplantasi ginjal. Namun ia masih memiliki keraguan antara tetap melakukan cuci darah atau transplantasi ginjal karena kedua cara tersebut memiliki resiko. Apabila saudara diminta untuk memberikan saran pada pasien tersebut (cuci darah atau transplantasi ginjal), saran apakah yang akan saudara sampaikan? Berikan alasannya!

Saran saya adalah melakukan transplantasi ginjal karena cara ini memberikan solusi dengan kurangnya yang lebih optimal dengan pasien tidak harus merasakan sakit & setiap melakukan cuci darah.

Jika ada pendonor yang cocok maka sebaiknya lakukan transplantasi ginjal lebih aman jika pendonornya pas dengan yang dibutuhkan pasien serta mengurangi biaya cuci darah setiap bulannya sehingga lebih efektif daripada cuci darah walaupun risikonya sama saja besar nantinya.

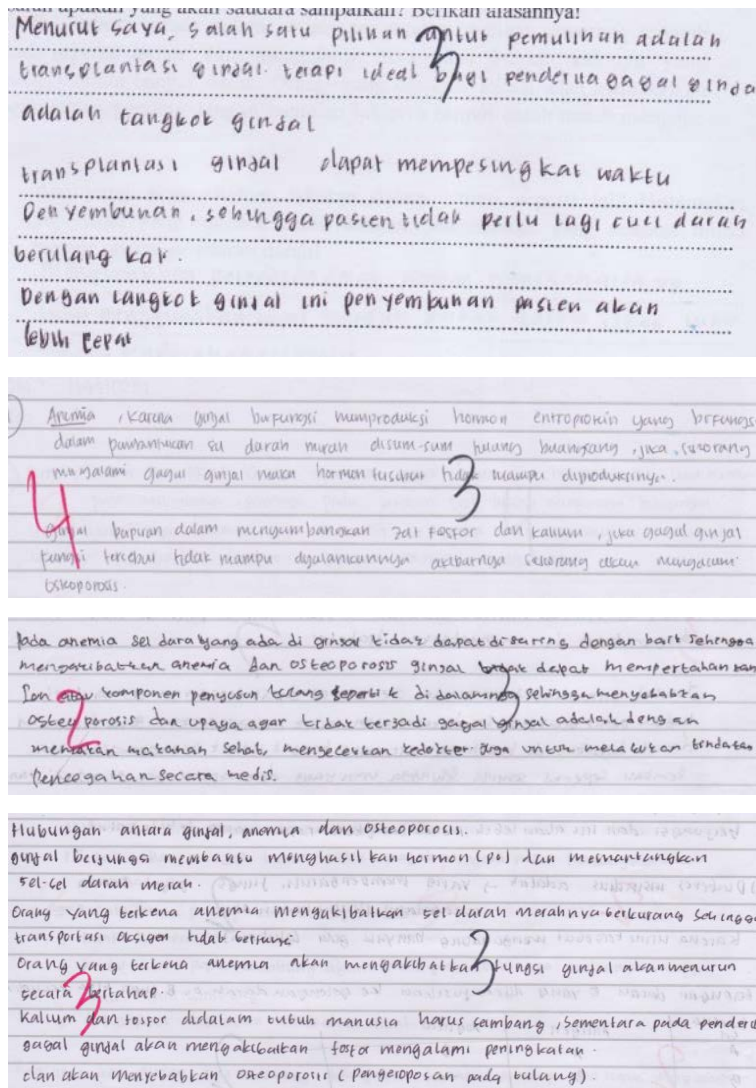


Figure 2. The Example of Student Answers

The process of achieving creativity involves deductive and inductive thinking which constitute parts of critical thinking. Wechsler (2012) explains that to produce new insights and solutions, problem-solving strategies and high-level thinking skills such as critical thinking are needed. The findings of this study indicate that students who are able to understand relationships between concepts and see them from different perspectives also have better critical thinking. The ability to connect concepts in order to find unique answers is an important characteristic of creative thinking (Hong & Choi, 2015).

The relationship between critical thinking and creativity through the Integrated PBLDMM model that has been carried out in this study implies that these two skills can be empowered simultaneously in the classroom. While creativity is needed to produce new ideas, critical thinking plays an important role in sorting out the alternatives so that the most appropriate solution can be found to solve the issue. The synergy of these two skills (critical thinking and creativity) is a quality that students need to possess to

embark on a career.

5. Conclusions

The results of the study showed that there was a significant correlation between critical thinking and creativity when Digital Mind Maps were integrated into Problem-based Learning. In addition, it was also found that both variables could be empowered simultaneously in the classroom and thus concurrent evaluation could be performed to both critical thinking and creativity. It is highly recommended for future researchers to consider other variables that may also affect the development of students' critical thinking and creativity.

Acknowledgements

This research was supported by the Educational Fund

Management Institution (LPDP), the Ministry of Finance of Indonesia with number FR2712018124893

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Students' Perceptions of Mobile Technology in Higher Education: Preparation to Design Mobile Learning Models

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract Education in the industrial revolution era 4.0 shows a change in the way of learning, thinking patterns and ideas of acting in high school students. One part that is inseparable from that is the use of mobile technology. This study aims to describe students' perceptions of the use of mobile technology as a tool for developing the right learning media in lecture activities at universities. This type of research is descriptive with a survey method of 100 students. The technique of collecting data uses a questionnaire. The findings show that students are very familiar with mobile technology, but the usage is still not directed according to the competencies to achieve in certain subjects. The results of this study also revealed that students have a positive perception of mobile technology. This report can be taken as a preparation for the design of a mobile learning model in higher education.

Keywords Students' Perceptions, Mobile Technology, Mobile Learning, Higher Education

1. Introduction

In the current era of globalization, the development of information and communication technology is increasing. They take effect in the world of education, especially in learning activities in higher education. Learning has undergone many changes along with the progress of the times. The concept of knowledge that was once monotonous and homogeneous has now changed and has many variations of the ideas of learning that can be applied. The change in the concept of teaching and learning is primarily to increase success in achieving learning goals. The purpose of learning is designed to be active and fast in

attaining goals that can improve the quality of learning and education.

The quality of learning is also supported by student activities. To get information that supports learning activities, it is inseparable from the role of mobile technology and the emergence of mobile technology. Mobile technology makes communication run fast in its application to learning, offers benefits to facilitate and accelerate the process of delivering information and interchanges between students, lecturers, and other implementers of learning, and provides a positive impact that can accelerate the accuracy of achieving learning and education goals. There are many examples of learning to use mobile technology, for example, using personal digital devices of assistants and cellphones which are the most commonly used technologies in mobile learning (Naismith, Sharples, Vavoula, & Lonsdale, 2004)

If they are associated with student trends in their daily life mobile technology. Sometimes the mobile technology cannot be used maximally for learning but is only used as a communication and entertainment suggestion. In line with that, this study wants to look at students' perceptions of mobile technology as a preparation for the design and development of mobile learning to support learning. All types of knowledge that occur in learning and space environments take into account technological mobility, student mobility and learning mobility (Your et al. 2014).

The development of mobile learning itself has been quite long. But not all universities, especially in Indonesia, have implemented it. The reason for not implementing mobile learning is positively very diverse. Research shows that impact mobile learning to apply in several countries such as Thailand, Malaysia (Chong, Chong, Ooi, & Lin, 2011), Pakistan (Abu-Al-Aish & Love, 2013), India, Nigeria, Taiwan (Hwang & Chang, 2011) and other countries. In

Indonesia, the application of mobile learning has been very rapid (Hanif, Asrowi, & Sunardi, 2018). But to design mobile learning models that can later be useful for learning, of course, it must begin with understanding students' perceptions of mobile technology that is often used by students. The Higher Education Sector needs to be informed about the actual use of mobile devices, and potential future trends in mobile learning. (Marinakou & Giousmpasoglou, 2015)

2. Literature Review

2.1. Student Perceptions

Students' Perception is a process of using the knowledge that has been possessed to obtain and interpret stimuli (stimuli) which are accepted by the system in the human senses. Perception concerns the relationship between humans and the environment using the knowledge they have. Students' perception is a complex interaction that involves at least three main components, namely selection, preparation, and interpretation. (Rachmadhani, 2016)

2.2. Mobile Technology

Mobile technology is a 21st-century technology that experiences rapid development. The development of mobile technology is also accompanied by the development of the internet, one of which is the development of social networking sites. Most social site services provide facilities for users to interact with other users. In addition to communication between users, information can be obtained easily from the many available resources. The form of the application of mobile technology is the growing development of m-commerce, m-money, m-library, and m-learning. The event was carried out to reach increasingly broad users. The results of research conducted show that mobile technology also has a positive impact on learning. (Kim-soon et al., 2015) The mobile technology

History of development began around 1980 with the birth of Generation One (1G) introduced as one-way communication. Then in 1991 it developed into the second Generation (2G) adding the capabilities of Short Message Services (SMS) and Multimedia Message Services (MMS), which allow picture messages to be sent and received via mobile devices. In 1998 a third-generation (3G) appeared and is introduced to offer faster data transmission speeds to support video calls and internet access. The fourth generation (4G) was released in 2008 to encourage more demanding services such as gaming services, HD cellular TV, video conferencing, and so on. Soon there will be a Generation 5 (5G) that has planned for the future. In Generation 5 (5G) data will be sent via radio waves.

2.3. Mobile Learning

Mobile Learning (m-learning) is part of electronic learning (e-Learning) so that, by itself, it is also part of distance learning (d-Learning). The constructivist learning environment imposes a new role for lecturers. Lecturers are facilitators for students who will motivate students to achieve and hone skills, direct how students learn concepts both inside and outside the classroom. (Hamdani, 2013). In modern life, there are emerging devices that can support mobile learning including laptops, tablet PCs, PDAs, and smartphones. (Göksu & Atici, 2013). Smartphone is a combination of voice, video, internet access and so on (Corbeil & Valdes-corbeil, 2007) From the research data conducted by smartphone, it is the most widely used device in mobile learning. (Ken Nee Chee, Noraffandy Yahaya, Nor Hasniza Ibrahim, & Mohamed Noor Hasan, 2017). Cellular learning technology has several general aspects such as portability, small size, interactivity, and everywhere. (Sönmez, Göçmez, Uygun, & Ataizi, 2018)

Here are some real conditions related to the development of cellular telephones which are the operational background of the emergence of mobile learning, namely: (1). The development of mobile learning devices are high-speed; (2) More than a PC; (3) More easy to operate than a PC (4) Mobile learning devices can use as learnings' media. Thought in mobile learning is based on the main reasons, namely: (1) Can be used anytime anywhere (on the network / outside the network); (2) Wide coverage can use commercial cellular networks; (3) Integrity with other systems.

From the explanation above, Mobile Learning is unique learning because students can access learning materials, directions and applications related to education, whenever and wherever. It will increase attention to learning material, make learning pervasive, and can encourage learners' motivation to lifelong learning. Also, compared to conventional knowledge, Mobile Learning can provide opportunities for students to repeat learning materials according to their desires and level of understanding.

There are three functions of mobile learning in classroom learning activities, namely as a supplement, complement, and substitution.

a. Supplements

Mobile Learning functions as a supplement, namely students have the freedom to choose, whether to use mobile learning material or not. In this case, there is no requirement for students to access learning material.

b. Complement

Mobile learning functions as a compliment, namely the material is programmed to complement the learning material that students receive in the classroom. Here means free learning material is processed to become material reinforcement or remedial for students in participating in learning activities.

c. Substitution

Several universities in developed countries provide several alternative models of learning activities for their students. The goal is to be able to flexibly manage the lecture activities according to the time and activities of students.

3. Methodology / Materials

This study aims to describe students' perceptions of the use of mobile technology. It prepared for developing a mobile learning model. The type of research conducted is quantitative descriptive with survey methods. The sample consisted of 100 students at Baturaja University consisting of 30 Faculty of Education students, 35 Economics Faculty students, and 30 Faculty of Social and Political Sciences students.

The distribution of questionnaires is done online which is distributed randomly to respondents. Data were analyzed quantitatively using percentages. The survey was designed to explore some information including the ownership of mobile technology, the time used in using mobile technology, applications that are used, and students' perceptions about the application of mobile learning models later.

4. Results and Findings

This section will present the results of the study. The results of this study were obtained from questionnaires distributed online to 100 students in 3 different faculties at Baturaja University. The survey consists of 5 parts, namely (1) Types of mobile technology that used; (2) Internet network access used; (3) The time used in using mobile technology; (4) Types of mobile applications that used; (5) Students' perceptions of mobile learning.

4.1. Types of Mobile Technology Devices Used

In this section we will explain the types of mobile technologies that are often used by students in supporting their activities. As shown in the following figure:

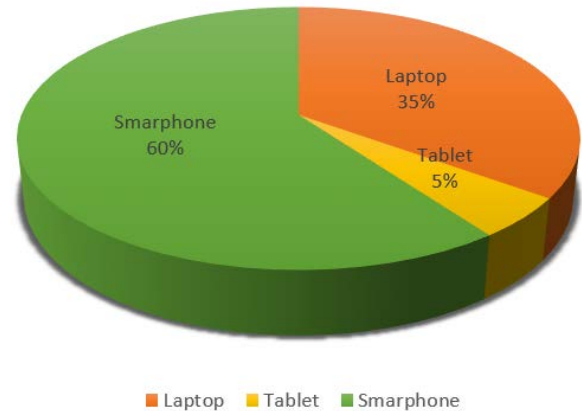


Figure 1. Types of mobile technology used

Figure 1 shows that 60% of students use smartphone in supporting their activities. The type of smartphone is chosen using Android. One of the reasons is of course because the smartphone is easy to carry with a small appearance. The second mobile technology device used is a laptop with 35%. Laptops are the choices as a device that can help students learn. Next is the tablet; this device is less attractive to students; the percentage of usage is only 5%.

4.2. Access to the Internet Network Used

Access the network used by students online and offline, as shown in the following figure:

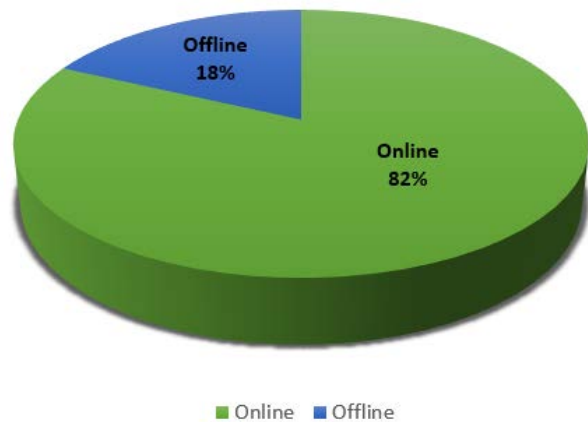


Figure 2. Access to the internet network used

Figure 2 shows that the level of online use is 82%, which means that almost all students can access network online. But there are still students who access the Internet offline for 18%. It's happening because not all areas or places of residence of students can access the Internet online. Demographically student residences are scattered in rural areas that only rely on cellular providers in accessing the internet.

4.3. Time Used in Using Mobile Technology

This section describes the average time of use in using mobile technology devices, especially mobile devices per day. The answer consists of 3 parts, which are less than 1 to 2 hours with a low category, around 3-4 hours in the small grade and more than 5 hours with a high degree. As shown in the following figure:

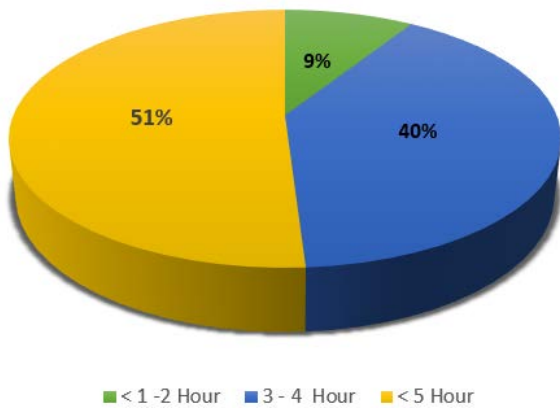


Figure 3. Access to the internet network used

Figure 3 shows that the time spent by students with mobile technology devices especially mobile devices varies. Students who use mobile technology in a low category are less than 1 to 2 hours per day at 9%, and an average grade is 40% with a usage time of around 3 to 4 hours. However, more than half of students use mobile

technology more than 5 hours per day which is 51%. This data shows the level of students' interaction with mobile technology, unusually high cellular devices. Mobile learning has a great opportunity to be applied in education.

4.4. Types of Mobile Applications That Are Often Used

This section shows the types of mobile applications used by students as a means of supporting their activities. As shown in the following figure.

Generally the use of mobile technology applications can be categorized as a means of social media, means of communication, looking for news and information, games and infotainment, the rest will be used for other purposes. From the results of the questionnaire that has been distributed, as many as 40% of students use the mobile application as a communication tool. It is especially true of daily activities in interacting with family, friends and also others. 27% of them use the mobile application as social media and they claims that they use in this section such as Whatsapp, Facebook, Tweeter, Instagram, and so on. 16% of students use the mobile application as a means to search for news and information on Google, Wikipedia, etc. As many as 15% use the mobile application for games and infotainment. Some of the games and entertainment applications are Youtube, Smule, Tiktok, CoC and other game applications. About 2% use the mobile application for others such as E-Commerce and so on.

From the results of this diagram, it can be a reference to how the design of the development of mobile learning models can do, for example, by combining learning into social media or vice versa. Design learning materials by utilizing infotainment applications makes it easier for students to access learning links videos, and many more designs that can do that are connected with the level of use of mobile apps. The design is expected to be able to assist students in learning and reach the standard of learning potential.

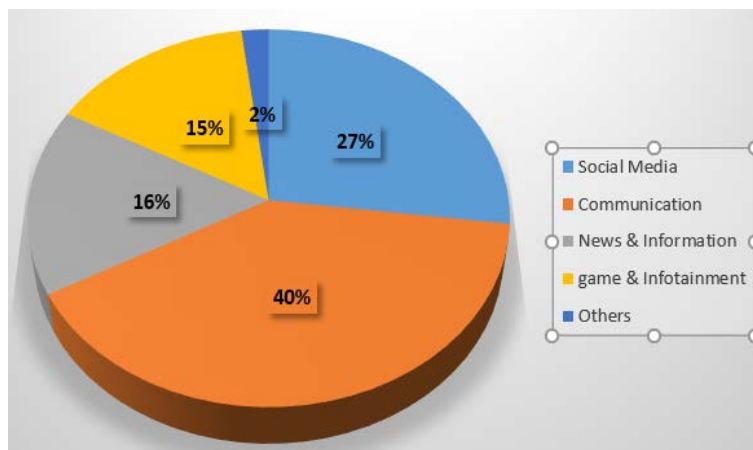


Figure 4. Type of mobile apps that used

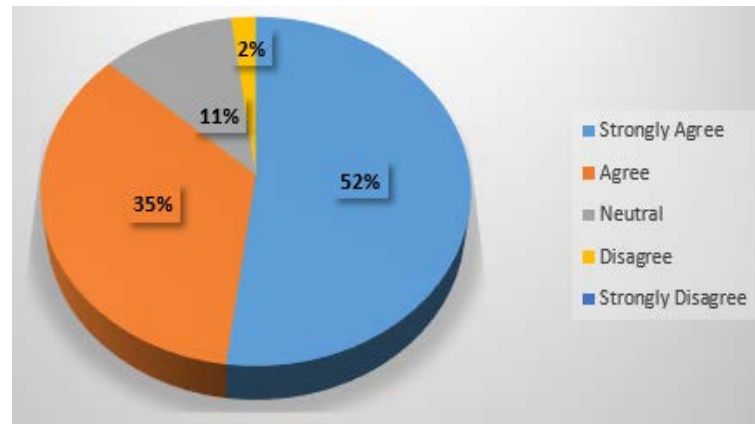


Figure 5. Student perceptions of mobile learning

4.5. Students' Perceptions of Mobile Learning

In this section, it measures students' perceptions of mobile learning. This becomes a reference in the design of the development of subsequent mobile learning. These results are shown in Figure 5.

Figure 5 shows that there are 2% of the students choosing to disagree and 11% neutral. About 35% of the students agree with the application of mobile learning. 52% of students strongly agree on the implementation of mobile learning. It is in line with some characteristics of mobile learning that can facilitate students in education, Mobile learning can be used by students wherever and whenever. Mobile learning adds variety in learning. With mobile learning, students can communicate directly with the lecturer on discussion topics that have been provided in the learning platform and so on.

5. Conclusions

The level of student needs for mobile technology, unusually high cellular devices with an average usage time of more than 5 hours per day. The mobile application used is diverse but has not been used maximally for learning. That can be one of the foundations in the design and development of the mobile broadband model at universities. It is supported by the results of research that has conducted that 35% of students agree and 52% strongly agree on the adoption of a mobile learning model. The design of the mobile learning models must be adapted to the dominant mobile application used by students so that the utilization of the mobile learning model can be maximally utilized in learning. The mobile learning model is expected to be able to make education more attractive and accessible wherever and whenever.

Acknowledgements

This research work is supported by the Ministry of

Research, Technology, & Higher Education, Indonesia (Doctoral Dissertation Research scheme of Universitas Negeri Jakarta).

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Teaching the Millennials: Implications on Today's Classrooms

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Received July 9, 2019; Revised September 9, 2019; Accepted September 16, 2019

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Abstract English teaching professionals dealing with students from all levels of education are reported to have faced challenges in meeting their students' needs. Born into the world of information, the Millennials are comprised of digital learners who are comfortable using technology in their everyday life. Students' predilection for technology is calling the educators to align their teaching strategies with students' learning preference. This paper therefore looks at the challenges educators face in teaching the Millennials as well as the strategies adopted in meeting the needs of this new generation. The survey which involved a department of language lecturers provides further insights into the discourse of teaching and learning in higher learning institutions.

Keywords Millennials, Net Generation, Digital Learners

1. Introduction

Teachers who work with children, adolescents and adults in all levels of education know that there is a difference in the way learners nowadays think and behave as compared to that of previous generations. The majority of these learners were born immersed in digital technology and are very comfortable using it in their daily activities, may it be for social or educational purposes. Volumes of research, as well as opinions from higher learning communities assert that educators need to respond to the needs of these digital learners.

The nature of the Millennials, or also known as Net generation who are tech-savvy and exhibits preference for the use of digital tools, has called for teachers to adapt to their students' multisensory learning styles. The traditional way of teaching such as chalk-and-talk, and the way in which teacher use printable handouts and is

textbook-dependent are increasingly becoming more irrelevant to these learners. To some teachers, especially those of different generations and are relatively new to digital technologies, it might be a challenge to tailor teaching approaches to fulfil the needs of this net generation. Therefore, this survey seeks to examine teachers' understanding, strategies used and challenges involved in teaching these digital learners.

2. Literature Review

2.1. Definition and Characteristics of Digital Learners

Digital learners, also known as the Net generation or the Millennials, are students who have grown up surrounded by and immersed in digital technologies in their everyday life. The majority of these learners were born in early 1990s up to present and is also referred to as Gen Y and Gen Z (Lancaster and Stillman, 2002). These learners are known to be tech-savvy for their preference to use digital devices in doing their daily activities from socializing, learning and seeking entertainments. They respond quickly to fast and attractive visuals and sounds as a result of exposure to multimedia in this digital era.

This generation is also characterized by their predilection for entertainment and games. Growing up in a world that has always Internet, it is common for digital learners to spend hours in front of devices screens playing video games, watching movies and keeping updated on social media. In the US, Rideout, Foehr & Roberts (2010) found out that four hours and a half per day was spent to use mobile phones and computers by adolescents aged between 8 and 18 years old to talk to peers, listen to music, watch videos, play games and access social media websites. Having access to digital devices and Internet almost all the time has also led digital learners to always opt for quick answers rather than longer problem-solving. This

generation are used to getting instant information on almost anything from the Internet that they are inclined to look for shortcuts without seriously considering neither the reliability of the information they get nor the ethicality of their conduct.

Another trait of learners in this digital era that can pose a problem is that they have relatively shorter attention span compared to students from previous generations. With persistent exposure to multimedia content that consists of enticing visuals and engaging music, digital learners easily lose focus when presented with traditional text without interactive graphics. They are used to fast delivery of content, data, and images from digital screens that appeal to their preference for multisensory materials. Therefore this generation is often portrayed as demanding immediate gratification, with short attention spans and no tolerance for delays (Frاند, 2000; Oblinger, 2003, Prensky, 2001a, 2001b) as cited in Smith (2012).

2.2. Meeting the Needs of Digital Learners in Higher Learning Institutions

In the last few decades, higher education communities have taken more interest and efforts in responding to the different needs of these digital learners. The demand for technology to be used in the educational setting is the reason why many higher learning institutions are going through transformational changes in doing their core business (Smith, 2012). These changes are necessary in order to accommodate to the “more technologically-driven, spontaneous and multi-sensory” learning preference (Prensky, 2001).

2.2.1. Using Digital Multimedia to Aid In-class Lessons

Incorporating technology in teaching can be done both in and outside of the classrooms. In classroom, digital learners benefit from digital content that teachers use to supplement traditional teaching materials, for example, the use of PowerPoint, Powtoon and Prezi to deliver lectures on top of the use of whiteboard and printouts. Other than that, having access to online videos and educational websites also helps students get access to authentic, interactive and interesting materials than can aid learning. Indeed, ICT has been used effectively in supporting traditional forms of teaching and administration in higher education institutions. Drawing data from the Speak Up 2014 survey conducted in US, Beerer (2016) reported that 40% of K-12 students watch online videos to help them understand concepts they learn in schools and a growing number of students are producing digital contents such as YouTube videos, slideshows and interactive games. The students are also reported to expect to use these digital resources to aid their learning.

2.2.2. Incorporating Problem-Based Learning

Using problem-based learning is one of the techniques

proposed by many instructors in teaching digital learners. Problem-based Learning (PBL) is a teaching method in which complex real-world problems are used as the vehicle to promote students’ learning of concepts and principles as opposed to direct presentation of facts and concepts. Beerer (2016) supports this when she emphasises that using relevant, problem-based teaching and learning serves digital learners as these learners naturally use their digital devices may it be smartphones or laptops to gather, organize and share information with classmates, teachers, parents and experts in finding solutions to real-life problems. A survey called Project Tomorrow involving 3.5 million students, faculty, parents and administrators carried out in 2003 found that digital learners are interested in things that are happening around the world. They frequently use digital tools and resources and become self-directed learners in learning and solving problems both in academic setting and in personal life (Humes, 2014).

2.2.3. Promoting Blended Learning

The term blended learning is generally applied to the practice of using both online and in-person learning experiences when teaching students. In blended learning, students learn in part through online learning and they have an element of control over where, when and how they want to work. Being active in self-directed learning, digital learners thrive in learning environments that is not only confined within the four walls of the classrooms. Blended learning provides this opportunity as students are required to go online to complete any tasks or assignments at a time that is convenient for them. Lai (2010) asserts that to meet the demands of the 21st century learners with preference for digital technologies, learning should be extended beyond the physical classrooms as it provides learners with lifelong learning skills that encourage collaboration and networking, which is an aspect that is very much valued by digital learners.

2.3. Barriers in Accommodating to Digital Learners

Although there is a widespread acceptance among the higher learning communities on the need to respond to the digital learners’ learning preference, the transformational changes are not without risks and problems. Rogers, Usher and Kaznowska (2011) as reported in Smith (2012) stated that overgeneralizing that all Net generations as digital learners who are comfortable and competent users of technologies can be damaging to the undergraduates as few researches have been carried out about the use of learning technologies from the perspectives of the so-called digital natives themselves. This is because not all Net generations have equal access and exposure to technologies. Other than that, Lai (2011) stated that many educators in higher learning institutions are reluctant to invest in

technology-enhanced teaching as there is little value in terms of career advancement. This is due to universities policies that commonly value research outputs as compared to performance in teaching. Lack of ICT facilities by the universities due to high cost is also cited as one of the barriers to using educational technologies in higher learning.

3. Methodology

In collecting data for this survey, a self-report questionnaire was administered to 30 lecturers from a language department of a public university. The questionnaire consists of four sections. Section A requires participants to provide background information such as age, gender and years of teaching experience while section B attempts to identify the respondents' understanding of digital learners. Section C on the other hand examines the strategies teachers in use in teaching digital learners while Section D focuses on examining how the respondents perceive employing the strategies as challenging. Respondents were required to respond to the items which employ a 7-point Likert scale.

4. Findings and Discussion

4.1. Examining Teachers' Understanding of Digital Learners

Based on the survey responses it was found that the majority of the respondents (86.7%) strongly agree that digital learners prefer to use digital tools in learning. All 30 respondents agree that digital learners respond to loud and quick visuals, audio, and music and that these learners show preference for entertainment and games. Slightly more than three-quarter (76.7%) agree that digital learners tend to opt for quick answers rather than longer problem-solving and only 1 respondent disagree to the statement. Despite almost all (96.7%) agreed that digital learners are self-focused and highly confident learners, 93.4% of the respondents felt that digital learners possess shorter attention span.

As a whole, it can be seen that a vast majority of the respondents agree that their students possess the characteristics of digital learners as have been discussed in much literature. Although it has been cautioned by Rogers, Usher and Kaznowska (2011) that not all Net generation are digital natives, it seems that to most of these respondents, their learners fit the profile of digital learners.

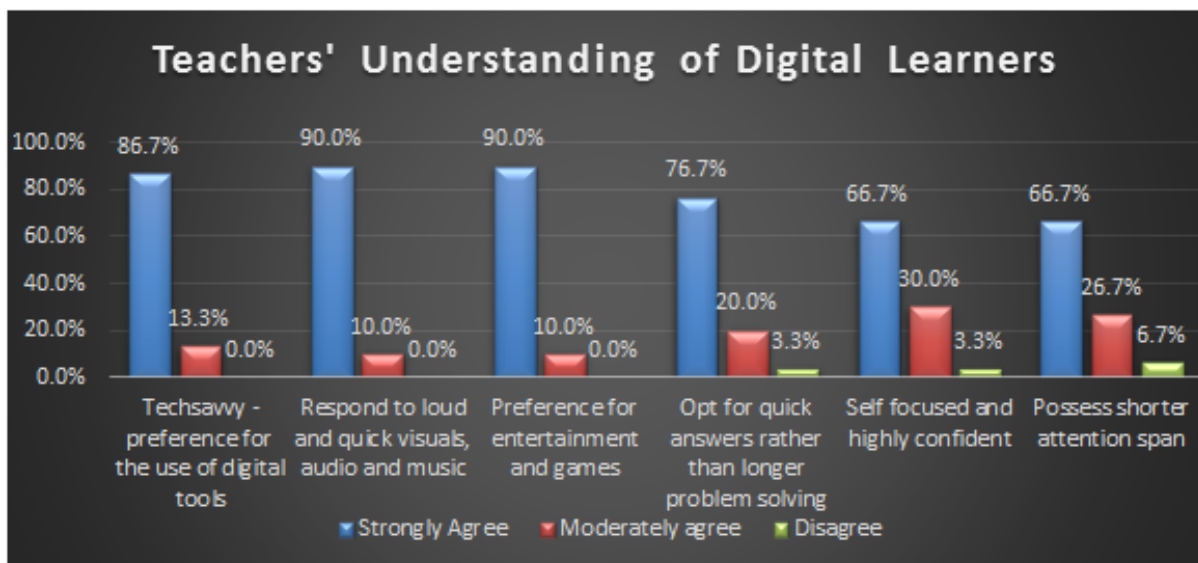


Figure 1. Teachers' Understanding of Digital Learners

4.2. Identifying Strategies Adopted in Teaching Digital Learners

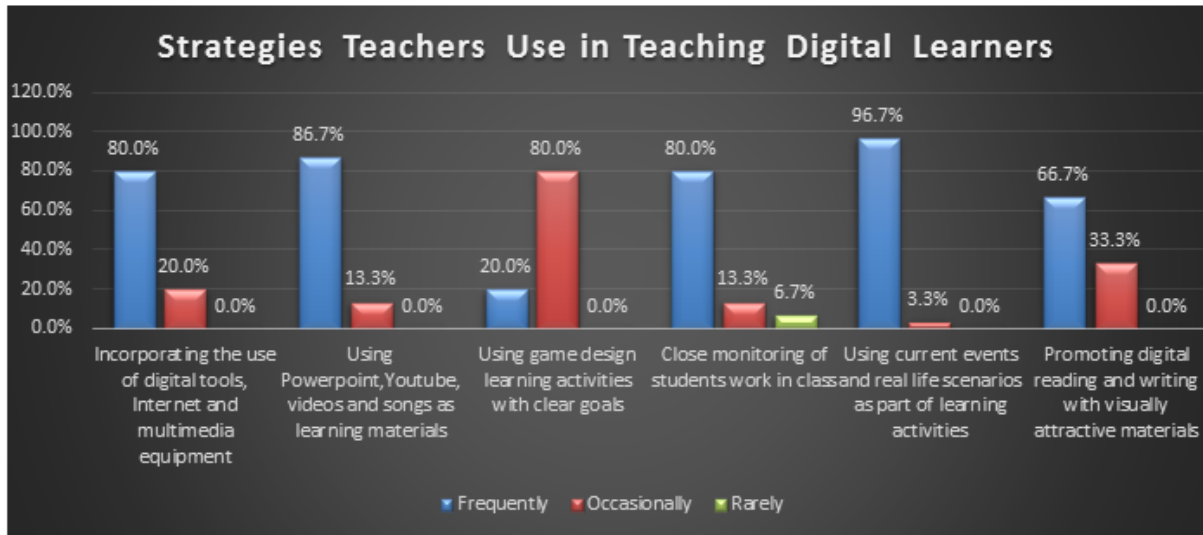


Figure 2. Strategies Teachers Use in Teaching Digital Learners

The majority of the respondents (80%) are reported to be frequent users of digital tools, Internet and multimedia equipment in teaching their students whereas the remaining 20% claimed to be only occasional users. Almost similar figures (86.7%) reported the frequently using of Powerpoint, Youtube, videos and songs as learning materials and 13.3% claimed to use it occasionally. Less than a quarter (20%) of the respondents reported to be frequent users of game design learning activities with clear learning goals in teaching the digital learners and the majority (80%) claimed to do this occasionally. 80% of the respondents are also reported to frequently monitor their students' work in class as to avoid academic dishonesty. Almost all respondents (96.7%) claimed that they frequently used current events and real-life scenarios as part of learning activities and almost two-thirds (66.7%) frequently promoted digital reading and writing with attractive graphics to engage their digital learners.

The findings of the survey indicate that the majority of the respondents attempted to tailor to the needs of the digital learners by incorporating the use of multimedia in their teaching. Additionally, recognizing that the Net generation are self-focused learners, the respondents frequently took the effort to use real life scenarios that learners can personally relate to as to better engage them in learning. In September 2015 contribution to the *eLearning*

Industry website, Timothy advocates for the learner-centred approach by outlining seven advantages: improves participation, improves retention of knowledge, boosts performance at work, develops problem-solving skills, fosters collaborative learning, makes learning more enjoyable as well as facilitates personalized learning. The respondents' occasional use of game design learning activities also contributes to the learning style of digital learners who have largely grown up exposed to video games. Drawing data from the Summit on Educational Games, The Federation of American Scientists (2006) has illustrated the benefits of learning that incorporates game attributes such as providing clearly defined goals, ample practice opportunities, continuous feedback, scaffolding as well as personalization. The majority of the respondents are also reported to have frequently monitored their students' work in the effort to deter academic dishonesty. Combes (2005) claimed that academic dishonesty is prominent among the Net generation due to the changing culture of information that is easily accessed, manipulated and disseminated to global audience. In the effort to combat plagiarism effectively in education, she proposed a few strategies that can be used by teachers including using plagiarism-detection website and software as well as producing authentic assessments that require higher order thinking skills.

4.3. Identifying Challenges Teachers Face in Teaching Digital Learners

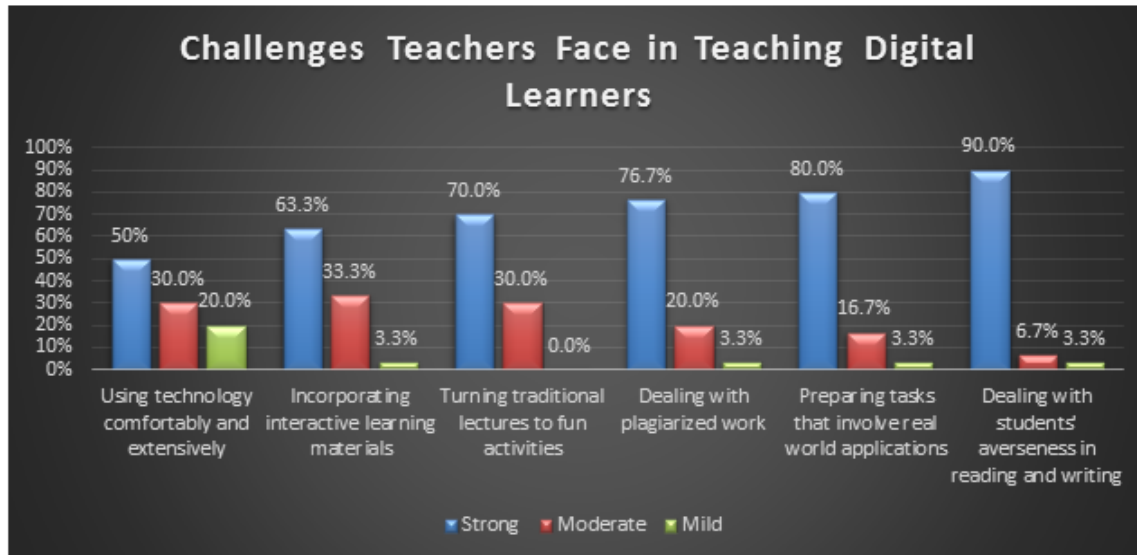


Figure 3. Challenges Teachers Face in Teaching Digital Learners

In examining the challenges teachers face in teaching digital learners, it was found that more than half to almost all respondents (50%-90%) felt that it posed a strong challenge for them in using technology comfortably and extensively in teaching, incorporating interactive learning materials into lessons, dealing with plagiarized work among students, preparing tasks that involve real world applications as well as dealing with students' averseness in reading and writing class. The remaining of the respondents, which is less than one-third (33.3% and below) of the respondents, felt that all these efforts posed only a moderate challenge for them in teaching these digital learners.

In general, the finding shows that although the respondents did try to tailor to their digital learners' needs, they perceived the efforts as challenging. It can be concluded that the biggest challenge in catering to this generation is dealing with the students' averseness in reading and writing, followed by preparing tasks that involve real life applications, dealing with plagiarized work, turning traditional lecturers to fun activities, incorporating interactive learning materials and using technology comfortably and extensively. There may be a few reasons as to why teachers find it a challenge to incorporate technology into their classrooms. Some of the reasons may be due to cost and time constraint. Apart from that, teachers who are of older generations and less active users of digital devices and Internet (digital immigrants as Prensky (2001) puts it) might be apprehensive in using technology in classrooms as it requires efforts to keep up with the continuous technological demands in teaching the Millennials.

5. Conclusions

This survey supports the claim that current students in higher learning institutions consist of Net generation the majority of whom possess the characteristics of digital learners. Digital learners are known to thrive in learning environment that incorporates the use of technology in teaching and learning. Because of technology as well, there are some challenges that teachers have to face in teaching this generation such as their tendency to commit academic dishonesty and reduced interest in reading. Therefore, it is crucial for educators to be mindful of these learners' characteristics and tendency to enable them to adopt teaching strategies that fulfil the academic needs of these students. The strategies largely involve embedding digital technologies both in class and beyond classroom learning which calls for teachers' readiness to change from traditional teaching to more learner-focused. As Laurillard (2008) puts it, incorporating digital technologies in education helps to produce learning that is not only active but also participatory, personalized, flexible as well as inclusive.

Acknowledgement

The authors would like to gratefully acknowledge Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang for the financial support for our participation at this conference.

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