International Journal of Innovation, Creativity and Change. www.ijicc.net
Volume 5, Issue 5, Special Edition: ICET Malang City, 2019

Problem-Based Learning Model in Practice-Oriented Student Work Sheets for Integrated Social Sciences

Hari Sugiharto Setyaedhi[1] Rusijono[2] Hidayati, A[3]
[1 2]Faculty of Educational Sciences, Surabaya State University, Unesa Lidah Wetan Campus, Surabaya, Indonesia 60213
[3]SMP Islam Integrated Insan Permata, Bojonegoro, Cendekia No.03 Bojonegoro
Email: [1]harisetyaedhi@unesa.ac.id [2] rusijono@unesa.ac.id, [3]armawatihidayati1@gmail.com

This research aims to test the feasibility and effectiveness of a practice-oriented Student Work Sheet (SWS) for Integrated Social Sciences based on the PBL model for changing learning outcomes. The research used the ADDIE model. The research subject is junior high school students. The research applies the quasi experimental design that uses the non-equivalent control group design for both pre-test and post-test. Research results showed: (1) the learning media in the form of a syllabus showed a validation score of 79.16%, and therefore is considered feasible to apply, (2) a significant difference between classrooms that do and do not use the SWS. This is evidenced from a post-test mean of 79.83 for Classroom A and 70.83 for Classroom B. It can therefore be concluded that the PBL-oriented SWS for Integrated Social Sciences is feasible and effective for improving the learning outcomes for the integrated social science subject.

Keywords: *learning model, SWS, Practice, Problem-Based Learning (PBL).*

INTRODUCTION

One of the problems facing the educational sector in regard to the learning process for integrated social sciences in particular concerns the inability of learners to gain a good grasp of the subject. This ineffective learning process affects learning outcomes of students. This is because students perceive social studies as boring, and as a subject area that require them to mostly memorize learning materials that are difficult to understand due to their abstract nature. This poses a challenge for educators to change their teaching style into one that can help students easily absorb their study materials without feeling bored. It is therefore necessary for educators to teach their students to observe, classify, interpret, predict, communicate, question, hypothesize, design experiments, use tools and materials, apply concepts and conduct experiments (Choo, Rotgans, Yew, & Schmidt, 2011; Julianti & Sumarmin, 2018; Mihardi, Harahap, & Sani, 2013; Misbah, Dewantara, Hasan, & Annur, 2018). However, for educators accustomed to teaching the traditional way of standing before the class to present materials and conduct Q&A sessions, it would be relatively hard for them to adjust to a new teaching method (Campoy-Cubillo, 2019; Fogarty, 1997; Hillman, 2003; Husodo, 2008; Lisniandila, Santyasa, & ..., 2019; Nordin, Embi, & Yunus, 2010; Wayuningati, 2017).

Given the reality above, the step to be taken is to develop one of the components of learning materials, which is a text media in the form of a Student Worksheet (SWS). SWS serves as a guide for students to inquire or solve problems. It also provides exercises for developing cognitive skills and all aspects of learning through experiments or demonstrations (Choo et al., 2011, 2011). According to the Department of National Education (Hidayati, Adi, & Praherdhiono, 2019; Jatmiko, Toenlioe, & ..., 2019; Kurniawan, Istiningrum, & Nuha, 2017), SWS should at least cover the core abilities for students to achieve, time management, the tools/materials needed for completing tasks, brief information, steps for completing the tasks, and reports to prepare. In the worksheet, tasks are prepared by the educator according to the core skills and learning objectives. In other words, the worksheet is a resource that can help facilitate and guide students in their learning process (Ikhsan & SB, 2016; In'am & Hajar, 2017; Office of Scientific and Technical Information (OSTI), 1980; Suparno, Sudomo, & Rahardjo, 2017; Sutama, Santoso, Gonadi, & Astuti, 2018; Zaim, 2017).

Furthermore, the practice oriented SWS is a medium that the researcher will develop as part of the learning strategy. A practice-oriented SWS will guide students to independently discover concepts as they engage in practice activities and answer the questions provided in the worksheet (Choo et al., 2011; Ikhsan & SB, 2016; Taylor et al., 2015). The worksheet will guide learners in practicing their scientific attitudes and training them to think critically. In developing a practice oriented SWS for integrated social sciences that draws from the aforementioned theory, the researcher conducts an initial analysis on the characteristics of the subject area.

Given that learning objectives of integrated social sciences primarily emphasize on critical thinking, curiosity, inquiry, problem-solving, and collaboration in interactions within society and the immediate environment, it is therefore suitable to achieve these objectives through a practice oriented SWS. This is because a practice-oriented worksheet consists of task sheets that adopt the scientific approach and a meaningful learning method.

A learning approach that can be applied for integrated social science practice activities is a Problem-Based Learning (PBL) model. PBL is highly suitable for a learning process that gives emphasis to real-world experiences (Patton, 1980; Reigeluth, 1983, 1999; Richey, Klein, & Tracey, 2010). A teacher's role in a PBL process is to present problems, give questions, facilitate student inquiry, and start a dialogue. Arends explains that the key characteristics of the PBL model include being problem-oriented or initiated by a driving question, interdisciplinary focus of the subject in problem-solving, authentic inquiry, collaborative investigation, and producing work (Arends & Castle, 1991; Borko & Putnam, 1996).

A practice-oriented SWS for integrated social sciences is a student-centred learning process for searching, discovering and applying (Miller, 1993; Rasagama, Zein, Setiawan, & ..., 2014; Shamsudin, Abdullah, & Yaamat, 2013). A learning approach that focuses on the process helps students effectively learn through direct experience and mental experience.
A learning process that engages students through activities that include physical and mental activities for knowledge building is practice. Practice can be described as a learning strategy that emphasizes a learning process with performance-based activities conducted indoors or outdoors. Learning through practice provides students with the opportunity to develop their psychomotor and intellectual skills, as well as an understanding of scientific procedures and attitudes. A process that facilitates students to learn through cognitive, affective and psychomotor experience will help students to achieve meaningful learning outcomes and objectives for the subjects taught.

Practise is advantageous in that it: a). builds and develops a scientific attitude, b) develops inquiry skills, c) facilitates students to link abstract, basic knowledge with empirical reality through what they see, feel and measure, and d). provides a real (concrete) picture of an event or incident. The practice strategy used for developing the integrated social science SWS calls for students to conduct performance-based activities or experiments on information that they see and read on the task sheets provided in the SWS (Ditzler & Ricci, 1994; Shamsudin et al., 2013; Sudarmin, 2013; Wulandari, Dasna, & ..., 2019; Yulianti, 2017).

Problem-Based Learning (PBL) is a learning model designed to help students acquire important knowledge that will enable them to solve problems and develop their own study model and build teamwork skills. One of the advantages of PBL is that it helps maintain a strong connection between theory and practice because knowledge always build up during

practice activities. In the PBL context, a student's learning process begins with a practice foundation and the theory grows from the practice (Hillman, 2003). PBL is an innovative learning strategy that engages students in solving a problem through stages grounded in a scientific method, allowing students to gain knowledge related to the problem. Furthermore, PBL can help develop high order thinking skills (HOTS) and stimulate collaboration for completing tasks. High-order thinking involves the ability to analyse, synthesize, evaluate and create. New knowledge that a student acquires therefore is more than just rote memorization of learning materials (Arends & Castle, 1991).

Students can learn independently or in a group by working on problems provided through the PBL method (Alfiah, 2017; Lisniandila et al., 2019; Silva, Bispo, Rodriguez, & Vasquez, 2018). PBL is designed on the premise that we can work out the many problems that we face in our daily lives (Roy, 2014; Sequeira, 2012; Surahman, Wedi, Soepriyanto, & Setyosari, 2018; Tam, 2018; Yen & Halili, 2015). The characteristics of problem-based learning are as follows: (1) learning starts with the introduction of a problem, (2) the problem is related to the student's real-life situation, (3) lessons are organized around the problem, (4) students assume major responsibility to create and implement their own learning process, (5) involves working in small groups, (6) students are expected to demonstrate the acquired knowledge through performance (Mukhadis, 2009; Nurhajati & Bachri, 2018; Ulfatin, 2009). A PBL strategy has the following features: 1) driving question or presentation of a problem, 2) interdisciplinary focus, 3) authentic investigation, 4) production of artefacts and exhibits, 5) collaboration (Arends & Castle, 1991). The ultimate goal of PBL is to assist students in building their intrinsic motivation. Intrinsic motivation increases when the student is motivated by his or her own interest, and feels challenged and satisfied when working on an assignment. Students will become even more motivated when they appreciate what they have learnt. They also become increasingly motivated when they believe that they have control over their learning outcomes (Hmelo-Silver, 2004).

METHOD

This study involves a research and development (R&D) process to study and develop a learning media by applying the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model (Branch, 2009; Pribadi, 2016). The product being researched and developed is a learning media in the form of an integrated social science SWS based on the problem-based learning (PBL) model. The research location for developing and testing the PBL-based SWS for integrated social sciences is SMP Islam Terpadu Insan Permata, a junior high Islamic school in Bojonegoro. The research subjects are: (1) students in classroom A as the experiment classroom and (2) students in classroom B as the controlled classroom. This is based on the following considerations: (1) the pre-test score between classrooms A and B is not too far apart; and (2) a short time interval of classes between classrooms A and B.
Research instruments are as follows:

1. Instrument sheet on the feasibility of the PBL-oriented SWS for social sciences obtained from feasibility assessments;
   a. Syllabus and Learning Implementation Plan (LIP) validated by lecturers who are learning experts to examine the suitability of the LIP as an interpretation of the Syllabus in a view to achieve Core Competencies (CC).
   b. The media, PBL-oriented SWS for integrated social sciences, validated by lecturers who are learning experts to examine the media's feasibility in terms of presentation, graphs and overall appearance.
   c. Integrated social science materials validated by lecturers who are experts in social science education. A practice oriented SWS is a key component in the content of learning materials, ensuring the consistency of concepts and materials in the Syllabus and LIP, and the materials, contextually.
2. Instrument sheet on the effectiveness of the PBL-oriented SWS for integrated social sciences obtained from:
   a. *Pre-test*, which is given to students before receiving materials for the purpose of gaining information on the students' initial knowledge level.
   b. *Post-test*, which is given to students after receiving materials for the purpose of gaining information on students' learning development, and their understanding of materials provided in the PBL-oriented SWS for integrated social sciences.

Data Collection Technique

Data for this research is collected through the following:

1. Feasibility review sheet of PBL-oriented SWS for integrated social sciences, which takes into consideration input from lecturers who are learning experts, media experts, and social science education experts. This technique helps determine whether the PBL-oriented SWS is feasible for application in the integrated social science learning process of junior high school students.
2. Learning outcome sheet of students involves written tests that consist of pre-test and post-test questions. The questions are developed in accordance with the learning objectives that the materials are expected to achieve.

Data Analysis Technique

1. **Feasibility analysis of the PBL-oriented SWS for integrated social sciences**
   A feasibility analysis of the PBL-oriented SWS for integrated social sciences uses the Likert scale. The worksheet can be used for research purposes when a validator assesses that the minimum feasibility criteria is met.

2. **Analysis of Learning Outcomes**
   Item Analysis
   a) The validity of test items is measured by using the product-moment correlation. Test items are considered to have high validity when the test measure what it claims to

measure [15]. Based on validation results, 2 out of the 12 test items are assessed to be invalid.

b) Reliability test. A test is considered to have a high level of reliability when the instrument can be used repeatedly, and the measurement results are relatively similar or consistent. A test can be measured by using Cronbach's alpha [16]. The measurement result based on SPSS for instrument reliability is 0.813, which means that the instrument's level of reliability is very high.

3. **Precondition Test**

Before a hypothesis test is conducted, a precondition test must precede. Data must be normally distributed and homogeneous. If data is not normally distributed or homogeneous, analysis will adopt the non-parametric statistical method.

a. Normality Test helps determine whether the data to be tested has normal distribution or not. The normality of data is measured through the One Sample Kolmogorov-Smirnov Test by using the SPSS program with a significance level of 0.05 (5%).
b. Homogeneity Test (through Levene's test) seeks to measure the learning outcomes generated from pre-test and post-test data for groups A and B with equal or unequal variances.
c. Hypothesis Test applies the parametric statistical method of Independent Samples T-Test. The Independent Samples T-Test is conducted when the data being tested is already normally distributed and the variances are homogeneous. An analysis is performed to measure the mean difference between pre-test and post-test results from 2 groups, i.e., classroom A and classroom B, with a significance level of 0.05 (5%).

RESULTS AND DISCUSSION

Feasibility of the Practice-Oriented SWS for Integrated Social Sciences Based on the PBL Model

The PBL-oriented SWS is validated by lecturers who are learning, media and material experts. Validation and recommendations for improvement were acted upon to assess the extent to which the SWS is feasible. The validation results are as follows: learning experts assigned a score of 89.28%, which falls under the "highly feasible" category; media experts gave a score of 88.33%, which falls under the "highly feasible" category; and content/material experts assigned a score of 81.66%, which also falls under the "highly feasible" category. The PBL-oriented SWS is therefore highly feasible for a trial run among junior high school students.

Learning Outcomes

For classroom A, the pre-test mean score is 46, while the post-test mean score is 79.83, showing a significant increase. The pre-test and post-test mean scores for classroom A are provided in Figure 1.

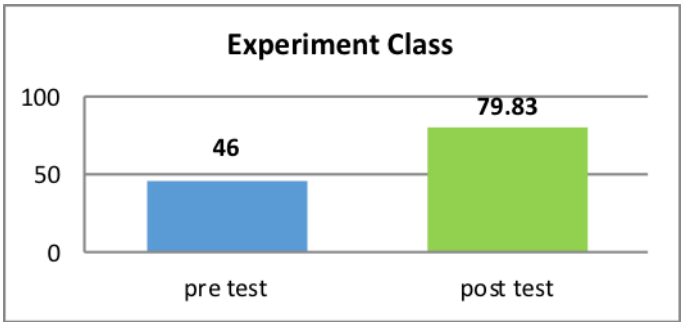

Figure. 1. Pre-test and post-test means of the experimental classroom

Meanwhile for classroom B, the pre-test mean is 46.3, while the post-test mean is 70.83. The pre-test and post-test means are presented in Figure 2.

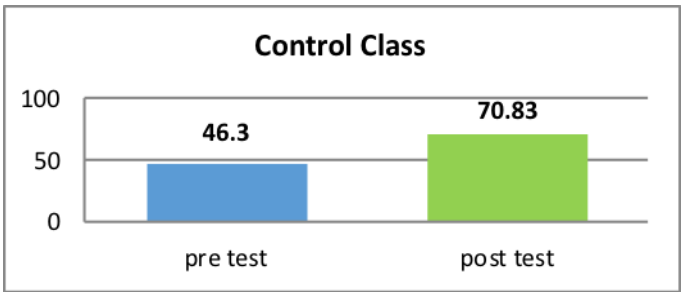

Figure. 2. Pre-test and post-test means of the controlled classroom

The pre-test mean score for classroom A (46) and classroom B (46.3) is equal as students have not been given any form of intervention. The researcher then intervened for classroom A by introducing the PBL-oriented SWS for integrated social sciences. As a result, the post-test mean score for classroom A (79.83) is higher than classroom B (70.83).

For the results of the Independent Samples T-Test, the pre-test score obtained a ρ value (significance) of 0.868. If $\alpha = 5\ \%$ is applied, then $\rho > \alpha$. This means that H_0 is accepted, signifying that there is no difference in the pre-test scores of classrooms A and B with mean scores that are not far from each other at 46 and 46.33 respectively.

Based on the Independent Samples T-Test, the post-test score obtained a ρ value (significance) of 0.012, and using $\alpha = 5\%$ means that $\rho < \alpha$ (i.e., $0.001 < 0.05$), therefore H_0 is rejected, and H_1 accepted. This indicates a significant difference between the post-test means of classrooms A and B.

CONCLUSION

Based on research results, the PBL-oriented SWS for integrated social sciences is proven to be effective and feasible for application. According to the media experts, earning a score of 88.33% means that the PBL-oriented SWS is considered to be “highly feasible” and, in the opinion of material experts, a 81.66% score means that the content of the SWS is also assessed to be “highly feasible.” Therefore, the PBL-oriented SWS is appropriate for use. Based on the T-Test, classroom A received a score of 80.17 and classroom B with 72.59. This means that classroom A which uses a PBL-oriented SWS outperforms classroom B. The practice oriented SWS for integrated social sciences based on the PBL model is therefore considered to be effective.

REFERENCES

Alfiah, A. N. (2017). Penerapan Model Problem Based Learning Untuk Meningkatkan Keaktifan Dan Hasil Belajar Ipa Siswa Kelas V. *Edcomtech Jurnal Kajian Teknologi Pendidikan*. Retrieved from http://journal2.um.ac.id/index.php/edcomtech/article/view/2072

Arends, R., & Castle, S. (1991). *Learning to teach* (Vol. 2). McGraw-Hill New York.

Borko, H., & Putnam, R. T. (1996). *Learning to teach.*

Branch, R. M. (2009). *Instructional design: The ADDIE approach* (Vol. 722). Springer Science & Business Media.

Campoy-Cubillo, M. C. (2019). Functional diversity and the multimodal listening construct. *European Journal of Special Needs Education*, *34*(2), 204–219. https://doi.org/10.1080/08856257.2019.1581402

Choo, S. S. Y., Rotgans, J. I., Yew, E. H. J., & Schmidt, H. G. (2011). Effect of worksheet scaffolds on student learning in problem-based learning. *Advances in Health Sciences Education*, *16*(4), 517.

Ditzler, M. A., & Ricci, R. W. (1994). Discovery chemistry: Balancing creativity and structure. *Journal of Chemical Education*, *71*(8), 685.

Fogarty, R. (1997). *Problem-based learning and other curriculum models for the multiple intelligences classroom.* ERIC.

Hidayati, A. S., Adi, E. P., & Praherdhiono, H. (2019). Pengembangan Media Video Pembelajaran untuk Meningkatkan Pemahaman Materi Gaya Kelas IV Di SDN Sukoiber 1 Jombang. *JINOTEP (Jurnal Inovasi Dan Teknologi Pembelajaran): Kajian Dan Riset Dalam Teknologi Pembelajaran*, *6*(1), 45–50.

Hillman, W. (2003). Learning How to Learn: Problem Based Learning. *Australian Journal of Teacher Education*, *28*(2), 1.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, *16*(3), 235–266.

Husodo, A. W. (2008). Penerapan Prinsip Problem Based Learning dan Competency Based Assessment untuk Meningkatkan Pemahaman Mahasiswa pada Mata Kuliah Pengantar …. *Jurnal Pendidikan Dan Pembelajaran (JPP)*. Retrieved from http://journal.um.ac.id/index.php/pendidikan-dan-pembelajaran/article/view/2579

Ikhsan, M. K., & SB, H. S. B. H. (2016). The Development Of Students'worksheet Using Scientific Approach On Curriculum Materials. *Proceedings of ISELT FBS Universitas Negeri Padang*, *4*(2), 74–87.

In'am, A., & Hajar, S. (2017). Learning Geometry through Discovery Learning Using a Scientific Approach. *International Journal of Instruction*, *10*(1), 55–70.

Jatmiko, A. G., Toenlioe, A. J. E., & ... (2019). Pengembangan Pembelajaran Menggunakan Webquest Materi Keragaman Budaya Indonesia Dan Interaksi Global Pada Mata …. *Jurnal Kajian Teknologi …*. Retrieved from http://journal2.um.ac.id/index.php/jktp/article/view/6983

Julianti, D. P., & Sumarmin, R. (2018). The Development of Student Worksheet Based on Scientific Approach on Environmental Pollution Topic For Junior High School Student Grade VII. *International Journal of Progressive Science and Technologies (IJPSAT)*, *10*(1), 11–18.

Kurniawan, F., Istiningrum, R., & Nuha, S. (2017). Pengembangan Lembar Kerja Siswa Berorientasi Kecakapan Hidup Pada Materi Sistem Indera Manusia Untuk Siswa Sma Kelas XI. *JINOTEP (Jurnal Inovasi Dan Teknologi Pembelajaran) Kajian Dan Riset Dalam Teknologi Pembelajaran*, Vol. 2, pp. 338–341. https://doi.org/10.17977/um031v2i22016p338

Lisniandila, N. P. A., Santyasa, I. W., & ... (2019). The Effect of Problem Based Learning Teaching Method on Students' Critical Thinking Skills in Physics Lesson at SMA Negeri 4 Singaraja. *JPP (Jurnal Pendidikan …*. Retrieved from http://journal2.um.ac.id/index.php/jpp/article/view/5509

Mihardi, S., Harahap, M. B., & Sani, R. A. (2013). The effect of project based learning model with kwl worksheet on student creative thinking process in physics problems. *Journal of Education and Practice*, *4*(25), 188–200.

Miller, T. L. (1993). *exploration-discussion: Teaching chemistry with discovery and creativity*. ACS Publications.

Misbah, M., Dewantara, D., Hasan, S. M., & Annur, S. (2018). The development of student worksheet by using Guided Inquiry Learning Model to train student's scientific attitude. *Unnes Science Education Journal*, *7*(1).

Mukhadis, A. (2009). Sosok dan Rambu-Rambu Pengembangan Kurikulum Berbasis Kompetensi di Perguruan Tinggi. *Jurnal Pendidikan Dan Pembelajaran (JPP)*. Retrieved from http://journal.um.ac.id/index.php/pendidikan-dan-pembelajaran/article/view/646

Nordin, N., Embi, M. A., & Yunus, M. M. (2010). Mobile learning framework for lifelong learning. *Procedia - Social and Behavioral Sciences*. https://doi.org/10.1016/j.sbspro.2010.10.019

Nurhajati, W. A., & Bachri, B. S. (2018). Pengembangan Kurikulum Diklat (Pendidikan dan Pelatihan) Berbasis Kompetensi dalam Membangun Profesionalisme dan Kompetensi

Pegawai Negeri Sipil (PNS). *Jurnal Pendidikan (Teori Dan Praktik)*, *2*(2), 156–164.

Office of Scientific and Technical Information (OSTI). (1980). *Solar envelope zoning: application to the city planning process. Los Angeles case study*. https://doi.org/10.2172/5141598

Patton, F. D. (1980). Beyond instructional design: A model for improving human performance. *Journal of Instructional Development*, *4*(2), 27–32. https://doi.org/10.1007/bf02907488

Pribadi, B. A. (2016). *Desain dan Pengembangan Program Pelatihan Berbasis Kompetensi Implementasi Model ADDIE*. Kencana.

Rasagama, I. G., Zein, H., Setiawan, A., & ... (2014). Efektivitas Model Belajar "Demonstrasi Interaktif Berbasis Inkuiri" dalam Meningkatkan Kemampuan Berpikir Analitik dan Kreatif Mahasiswa Teknik Konversi Energi …. *Jurnal Pendidikan Dan …*. Retrieved from http://journal.um.ac.id/index.php/pendidikan-dan-pembelajaran/article/view/3874

Reigeluth, C. M. (1983). *Instructional design theories and models: An overview of their current status*. Routledge.

Reigeluth, C. M. (1999). What is instructional-design theory and how is it changing. *Instructional-Design Theories and Models: A New Paradigm of Instructional Theory*, *2*, 5–29.

Richey, R. C., Klein, J. D., & Tracey, M. W. (2010). *The instructional design knowledge base: Theory, research, and practice*. Routledge.

Roy, D. (2014). Website analysis as a tool for task-based language learning and higher order thinking in an EFL context. *Computer Assisted Language Learning*, *27*(5), 395–421.

Sequeira, A. H. (2012). Developing Higher Order Thinking Skills (Hots) in Cognitive Domain of Learning. *Available at SSRN 2111032*.

Shamsudin, N. M., Abdullah, N., & Yaamat, N. (2013). Strategies of teaching science using an inquiry based science education (IBSE) by novice chemistry teachers. *Procedia-Social and Behavioral Sciences*, *90*, 583–592.

Silva, A. B. Da, Bispo, A. C. K. de A., Rodriguez, D. G., & Vasquez, F. I. F. (2018). Problem-based learning: A proposal for structuring PBL and its implications for learning among students in an undergraduate management degree program. *Revista de Gestão*, *25*(2), 160–177.

Sudarmin, S. (2013). Kemampuan Generik Sains Kesadaran Tentang Skala Sebagai Wahana Mengembangkan Praktikum Kimia Organik Berbasis Green Chemistry. *Jurnal Pendidikan Dan Pembelajaran (JPP)*. Retrieved from http://journal.um.ac.id/index.php/pendidikan-dan-pembelajaran/article/view/3866

Suparno, Sudomo, & Rahardjo, B. (2017). Developing students' worksheets applying soft skill-based scientific approach for improving building engineering students' competencies in vocational high schools. *AIP Conference Proceedings*, *1887*(1), 20010. AIP Publishing.

Surahman, E., Wedi, A., Soepriyanto, Y., & Setyosari, P. (2018). Design of Peer Collaborative Authentic Assessment Model Based on Group Project Based Learning to Train Higher Order Thinking Skills of Students. *International Conference on Education and Technology (ICET 2018)*. Atlantis Press.

Sutama, I. W., Santoso, S. T. P., Gonadi, L., & Astuti, W. W. (2018). Improving Questioning Skill through Application of the Scientific Approach to Children 3-4 Years Old. *1st International Conference on Early Childhood and Primary Education (ECPE 2018)*. Atlantis Press.

Tam, N. T. M. (2018). Using Problem-Based Learning To Promote Students'use Of Higher-Order Thinking Skills And Facilitate Their Learning. *VNU Journal of Foreign Studies*, *34*(2).

Taylor, J. A., Getty, S. R., Kowalski, S. M., Wilson, C. D., Carlson, J., & Van Scotter, P. (2015). An efficacy trial of research-based curriculum materials with curriculum-based professional development. *American Educational Research Journal*, *52*(5), 984–1017.

Ulfatin, N. (2009). Service Learning sebagai Alternatif Metode Pembelajaran Pengetahuan Sosial dalam Kurikulum Berbasis Kompetensi. *Jurnal Pendidikan Dan Pembelajaran (JPP)*. Retrieved from http://journal.um.ac.id/index.php/pendidikan-dan-pembelajaran/article/view/632

Wayuningati, N. R. (2017). Penerapan Problem Based Learning dan Media Flipcart untuk Meningkatkan Hasil Belajar Ipa Materi Ekosistem Siswa. *Ilmu Pendidikan: Jurnal Kajian Teori Dan ….* Retrieved from http://journal2.um.ac.id/index.php/jktpk/article/view/2557

Wulandari, A., Dasna, I. W., & ... (2019). The Effectiveness of Contextual-based Instructional Materials of Elements of Group 15 For Inorganic Chemistry. *JPP (Jurnal Pendidikan ….* Retrieved from http://journal2.um.ac.id/index.php/jpp/article/view/10002

Yen, T. S., & Halili, S. H. (2015). Effective teaching of higher order thinking (HOT) in education. *The Online Journal of Distance Education and E-Learning*, *3*(2), 41–47.

Yulianti, D. (2017). Problem-Based Learning Model Used to Scientific Approach Based Worksheet for Physics to Develop Senior High School Students Characters. *Journal of Physics: Conference Series*, *824*(1), 12009. IOP Publishing.

Zaim, M. (2017). Implementing scientific approach to teach English at senior high school in Indonesia. *Asian Social Science*, *13*(2), 33–40.