# The Implementation of Project-Based Learning Model with Instagram Media towards Students' Critical Thiking and Creativity

**Cynthia Putri Arlinda✉, Aditya Marianti, Margareta Rahayuningsih**

Universitas Negeri Semarang, Indonesia

## Article Info

## Abstract

The 21st- century learning is oriented on 21st-century competencies, such as critical, creative, communicative, and collaborative thinking skills. These are important to be instilled and can develop the learners' skills. One of them is to develop creativity and motivation for the learners. A project-based learning model with Instagram is a suggested learning model to allow learners to develop their skills. This research aims to analyze the Pjbl with Instagram as the media toward the learners' creativity about invertebrate as the material. The applied method was Quasy Experimental research with Nonequivalent Control Group Design. The population consisted of the tenth graders of the Science and Mathematics class of Public Senior High School 1 Ungaran, in the academic year 2020/2021. The findings showed that the critical thinking skills obtained an average score of 88.7. The result was higher than the minimum mastery standard, $\geq 75$. Then, a t-test was done. The results showed that the learner's creativity was 90.1% for the experimental group. Both of them obtained "excellent criterion". Based on the results, it could be concluded that the Pjbl with Instagram as the media could improve the critical and creative thinking skills of the learners.

## How to Cite

✉ Correspondence Author:
E-mail: arlindacynthia@gmail.com

**INTRODUCTION**

Indonesian education has experienced changes. According to Daryanto and Syaiful (2017), the promotion of the 2013 curriculum demands the learning to be authentic in which the tasks and problem-solving should be carried out based on the environmental reality. The applied assessment has shifted from test assessment into authentic assessment (measuring the competencies of attitudes, skills, and knowledge based on the process and products). 21st-century learning focuses on critical, collaborative, creative, and communicative thinking skills. It has a purpose to make competitive and successful learners in the 21st century. From those four aspects, creative and critical thinking skills could be applied in invertebrate learning. Critical thinking skills must be mastered and have positions equal to knowledge and information management. The skill is important because knowledge and information are less effective in real job performance or social life. Learners should be able to solve problems by making effective decisions and thinking critically (Snyder, L.G and Snyder, M, 2008). Being creative means having creative power, a skill to create something creative and full of attributes. Creativity is a self-appreciation toward problems by sharing the solutions spontaneously that comes from personal thought (Zubaidah, 2016).

21st-century is needed to develop critical, creative, communicative, and collaborative powers of the learners. The development is indicated with the information and communication technology uses in all life aspects, including the learning process. Critical thinking skills, problem-solving skills, innovation, communication, collaboration are important competencies in the 21st century. Schools must prepare their learners to get into the 21st century. Besides that, 21st-century is needed for the learners as the millennial generation in this disruption era. One of the demands in the 21st century is creativity.

Problems in learning about invertebrates were studied by Hilyani and Dani (2018). They found lower learning outcome about the material was due to the applied evaluative questions for the learning process. The teacher had not applied critical-thinking skill orientation questions. It made the learners had difficulties managing the provided information. It was in line with Alawiyah, Nur & Anandita (2016). They found the learning difficulties faced by learners about invertebrates as the material consisted of internal and external factors. The internal factor consisted of intelligence while the external factor dealt with the teachers, indicated from the applied method and learning media.

The material about invertebrates must be learned by the tenth graders of SHS in the even semester. The material is attached in core competence 3.8. The competence to achieve is - applying the application of classification principle to group the animals into phylum based on the anatomy and morphological observations and their roles in life. The core competence 4.8 also demands learners to present the data about body tissues of animals and their roles for life aspects in the form of written reports. The material has eight phyla to learn. Learners are also required to group the characteristics of each phylum.

Project-based learning is an effective learning model because it develops the learners' knowledge and reflects their projects. The syntax of PjBL consist of (1) starting with the essential questions, (2) designing a plan for the project, (3) creating a schedule, (4) monitoring the students and the progress of the project, (5) assessing the outcome, and (6) evaluating the experience. It could improve the learning motivation, confidence, and cooperation of the learners (Shin, 2018). Chiang and Lee (2016) found that Pjbl was better than the traditional method. It was the model could encourage the learning and improve the problem-solving skill of learners. One of the media that could be applied to encourage learning is Instagram.

It is a medium to share photographs and free videos. The application is available in *IOS Apple, Android,* and *Windows Phone.* The users could upload the videos, share them with their followers, and share them with their friend groups. They could see, comment, and like the post shared by their friends on *Instagram.* By the age of 13-years-old, an individual may create an *Instagram* account by using email (Instagram, 2020). Veygid (2020) plus the questionnaire of the SHS learners showed that *Instagram* was suitable for learning biology online. It was Instagram is already recognized and familiar with the current generation, especially the SHS learners. The latest feature, the *live* feature, could facilitate the interaction between teacher and learners.

*Pjbl* learning model with *Instagram* as the media could make learners active in the learning process. They also could find knowledge autonomously by critically and creatively thinking and cooperatively working with their peers. Then, the obtained knowledge could be constructed into a product so they could show it via *Instagram. Instagram* allows the material about invertebrate to be delivered in the form of a video or summary.

Learners would be motivated because the products had to be uploaded via the Instagram-class account. It could improve their 21st-century skills. This method covered all learning outcome assessment aspects, the cognitive, affective, and psychomotor aspects. From the explanation, the researcher considered that study about *PjBL* with Instagram as the media to improve the critical and creative thinking skills of the learners about invertebrate as the materials at Public SHS 1 Ungaran.

From the problem formulation, it was important to research the implementation of Pjbl with Instagram as the media toward the learners' creativity about invertebrates as the material. PjBL with Instagram as the media toward learners' creativities in teaching-learning activities was expected to improve the learners' creative thinking skills.

## METHOD

The study was carried out in Public SHS 1 Ungaran. The applied method was a Quasi-experimental method with a Nonequivalent control group design. The population consisted of the tenth graders of the school from two classes of Science and Mathematics program, the academic year 2019/2020. The sampling applied purposive sampling. The data consisted of critical thinking skills, creative products, responses collected with a questionnaire, and interview results with the teacher. The data about learners' critical and creative thinking skills were the main data.

## RESULT AND DISCUSSION

The research was done at Public SHS 1 Ungaran by using two samples. They were the tenth graders of Science and Mathematics class-2 as the experimental group and tenth graders of Science and Mathematics class-3 as the control group. The experimental group was intervened with *PjBL* assisted with the media while the control group was taught with PjBL model implementation. The PjBL implementation with *Instagram* as the media for the learning material was successfully done based on the *PjBL* syntax.

The research was done within four meetings. The first meeting consisted of the first stage of *PjBL* syntax, proposing the essential question. The next meeting of the material was done with three stages of PjBL syntax They were designing the project, arranging the schedule, and monitoring the learners and the project progress. The third meeting consisted of the outcome assessment. Then, the fourth meeting was done with the evaluation. After promoting all stages of the syntax, the results consisted of critical and creative thinking skill outcomes of the learners.

The critical thinking skill results were obtained from statistics tests, such as normality, homogeneity, *paired t-test*, and *N-gain* tests. After the tests, the percentage of each indicator was also calculated. The obtained results of creativity were based on the creative thinking skills, the assessment checklist, and the poster checklist. On the other hand, the supplementary data were such as the learners' and teachers' responses. They were analyzed descriptive-qualitatively.

**Critical Thinking Skill Achievement**

The critical thinking skills of the learners were obtained from the *pretest* and *posttest*. The pretest results were used to determine the initial level skills of the learners about the materials. The pretest result descriptions about the material are shown in Table 1.

The table shows the classical learning outcome passing grade of both groups is 2.78% for the control group and 5.56% for the experimental group. It proved that many learners from both groups had not accomplished the minimum mastery standard of the materials. Therefore, a

**Table 1**. The Initial Descriptions based on the Pretest Results of Control and Experimental Groups

| Remarks | Control Group (X SM 3) | Experimental Group (X SM 2) |
| --- | --- | --- |
| Highest Score | 87.5 | 100 |
| The Lowest Score | 35 | 35 |
| The Average Score | 60 | 63.3 |
| Deviation Standard | 11.09 | 14.04 |
| The Numbers of Learners Passing the Minimum Standard Mastery | 1 | 2 |
| The Number of Learners under the Minimum Standard Mastery | 35 | 34 |
| Classical Passing Grade Percentage | 2.78% | 5.56% |

normality test was carried out to determine the significantly different values of both groups. Based on the normality test with the One-sample Kolmogorov-Smirnov test, the significant value of the control group was 0.304 > 0.05 while the experimental group was 0.478 > 0.05. It meant $H_1$ was denied while the $H_0$ was accepted for each group. It meant there was no significant difference between both groups. Thus, the pretest of both groups was considered to have a normal distribution.

After the pretest, the learners were intervened with the PjBL model for four meetings. Then, at each ending of the class, the learners were given posttests. The posttest was used to determine the learners' skills after being intervened. It had a purpose to obtain the classical learning accomplishment of the learners. The posttests' descriptions, based on the statistics calculation, are shown in Table 2.

**Table 2**. The Posttest Result Descriptions of Control and Experimental Groups

| Remarks | Control Group (X SM 3) | Experimental Group (X SM 2) |
|---|---|---|
| Highest Score | 95 | 100 |
| The Lowest Score | 57.5 | 90.3 |
| The Average Score | 78.3 | 88.7 |
| The Numbers of Learners Passing the Minimum Standard Mastery | 26 | 36 |
| The Number of Learners under the Minimum Standard Mastery | 10 | 0 |
| Classical Passing Grade Percentage | 72.22% | 100% |

The table shows each group has different results. The average of the experimental group is 78.3, higher than 75, meaning that the learners had achieved the minimum mastery standard. On the other hand, the classical grade of the control group was 72.22%, lesser than 75, meaning the learners had not passed the minimum mastery standard. The results of the experimental group were better than the control group. It was proven with the obtained average score, 90.3. It showed that the average score was higher than the minimum mastery standard, 90.3 > 75. The classical accomplishment of the group was 100%, higher than 805. Thus, the test results showed that the *PjBL* model with *Instagram* as the media for lear-

ning the material about invertebrate could improve the learners' critical thinking skills better than only applying the *PjBL* model. The result was tested with statistics tests, such as normality, homogeneity, *paired t-test*, and *N-gain* tests.

Based on the normality test of one-sample Kolomogor-Smirnov assisted with SPSS, the obtained significance of the control group was 0.792, higher than 0.05. Thus, $H_0$ was accepted while $H_1$ was denied. On the other hand, the PjBL implementation with *Instagram* as the media showed normal distribution with 0.214 > 0.05. Thus, the data were from the normally distributed population. Then, the homogeneity test was done for both groups.

The homogeneity test with SPSS obtained a significant value of 0.478 > 0.05. Thus, $H_0$ was accepted while $H_1$ was denied. Thus, the data were homogeneous and no differences in terms of data variety. After finding out that the data were normal and homogeneous, a *paired t-test* was done as shown in Table 3.

**Table 3**. The *paired t-test* results

| Groups | N | Mean | Sig. ($\alpha=0{,}05$) | Remarks |
|---|---|---|---|---|
| Control Group | 36 | 78.83 | 0.00 | There was a difference |
| Experimental Group | 36 | 90.35 | 0.00 | |

The table shows both groups obtain the sig (2-tailed) 0.000 < 0.05 for the posttest. Thus, $H_0$ was denied and $H_1$ was accepted. There was a significant difference between both groups.

The *N-Gain* was used to determine the learners' cognitive learning outcomes. The results are presented in Figure 1.
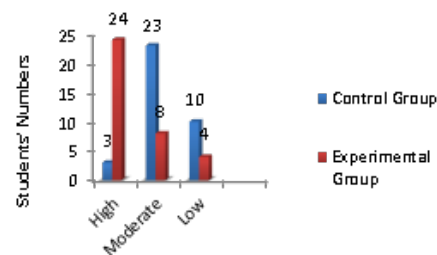


**Figure 1**. The *N-Gain* calculation of both groups

Figure 1 shows the critical thinking skill improvement of both groups. From the figure, the *N-Gain* of the experimental group was higher than the control group. The N-Gain result of the control group obtained a "high" category. It consisted of three learners with a percentage of

8.3%. Then, the "moderate" category consisted of 23 learners with a percentage of 63.9%. The "low" category consisted of 10 learners with a percentage of 27.8%. The N-Gain result of the experimental group obtained a "high" category. It consisted of three learners with a percentage of 66.7%. Then, the "moderate" category consisted of 8 learners with a percentage of 22.2%. The "low" category consisted of 10 learners with a percentage of 11.1%. Thus, it could be concluded that the *PjBL* with *Instagram* as the media for the material about invertebrate could effectively improve the learners' critical thinking skills.

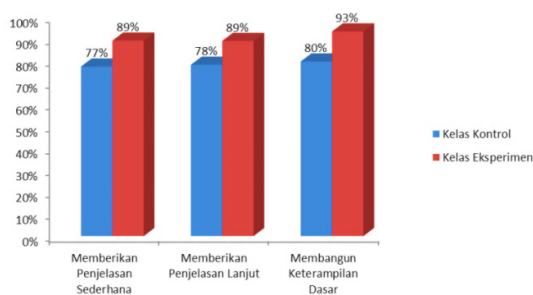The critical thinking skill score achievements in this research had the following indicators, shown in the Figure 2.



**Figure 2**. The Results of Critical Thinking Skill Assessments based on each Indicator

The figure shows the critical thinking skills for each indicator consisted of *elementary clarification*, *advanced clarification*, and *basic support*. The results of the control group were 77.3%, 78.1%, and 79.6% consecutively with an average score of 78.4%. The experimental group obtained percentages of 89.1%, 89%, and 93.3% consecutively with an average score of 90.5%. Thus, the experimental group was better than the control group. It could be concluded that the applied model with the media could improve the learners' critical thinking skills on each assessed indicator.

**The Learners' Creative Achievements**

The learners' creativities consisted of four creative thinking indicators: fluency, flexibility, originality, and elaboration. In this case, the indicator was added with durability and poster scores as the products of the project. The creativity assessment had a purpose to determine the learners' creativity during the learning process for both groups.

In this research, the creative thinking skills were measured when the learners conducted the project that was assessed and the assessed poster as their final products. In this case, the researcher also used the observation checklist. These values were calculated to obtain the creativity scores of the learners. The recapitulation is presented in Table 4 and the following Figure 3.

**Table 4**. The Results of Creative Thinking Skill Assessments based on each Indicator

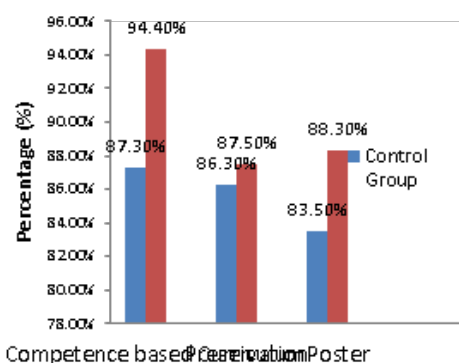| Indicators of Creative Thinking Skill | Control Group | Experimental Group |
|---|---|---|
| Fluency | 93.1% | 100% |
| Flexibility | 91.7% | 100% |
| Originality | 84% | 86.8% |
| Elaboration | 80.6% | 91% |
| Average Score | 87% | 94.4% |



**Figure 3**. The Results of Learners' Creative Assessment Results of CBC, Preservation, and Poster Scores

The creative thinking skill assessments of the learners consisted of four indicators. They were fluency, flexibility, originality, and elaboration. Both groups had high average scores, 87%, and 94.4%. The percentage of the learners' creative thinking skills was categorized as "very excellent".

From the table, the results of the learners' creativity assessments of the experimental group were higher than the control group. The percentage of the creativity score average was 90.1%, categorized as excellent. Meanwhile, the creative score average of the control group was 85.7%, categorized as "very excellent".

**The Learners' Response Results**

The learners' responses referred to feedback given by the learners toward the applied learning. The data of the learners' responses at the end of the learning were in the form of a yes-no questionnaire. The learners' response results are shown in Table 5.

**Table 5**. Learners' responses toward the material about invertebrate promotion

| Question items | Σ score of "Yes" | Scores Maximum | Scores (%) | Criteria |
|---|---|---|---|---|
| The learning was interesting and not boring so learners were motivated in joining the learning activities | 678 | 72 | 94.44 | Very excellent |
| It was happy because it made me closer to nature | 61 | 72 | 84.72 | Very excellent |
| I am motivated to complete my project excellently. | 68 | 72 | 94.44 | Very excellent |
| I could cooperate in a group excellently. | 61 | 72 | 84.72 | Very excellent |
| The material about invertebrates was more understandable. | 64 | 72 | 88.89 | Very excellent |
| The material about invertebrates was easy to remember. | 66 | 72 | 91.67 | Very excellent |
| The tasks of the material burdened me. | 57 | 72 | 79.17 | Baik |
| The material about invertebrates invited us to think comprehensively in solving problems. | 66 | 72 | 91.67 | Very excellent |
| I am happy with the material because the learning atmosphere was so active and challenging. | 65 | 72 | 90.28 | Very excellent |
| I prefer learning invertebrate to the lecturing method. | 64 | 72 | 88.89 | Very excellent |
| I prefer learning invertebrate material because it applied a familiar media. | 64 | 72 | 88.89 | Very excellent |
| I could present the group project via *Instagram.* | 65 | 72 | 90.28 | Very excellent |
| Learning about the material motivated me to always learn biology. | 58 | 72 | 80.56 | Baik |
| The learning material made me understand myself better. | 51 | 72 | 70.83 | Baik |
| I always solve the problems during the project by discussing, studying the literature, and asking the teachers. | 61 | 72 | 84.72 | Very excellent |
| I had difficulties creating the preservation project and poster during the material. | 64 | 72 | 88.89 | Very excellent |
| The preservation and poster of our group were done excellently. | 71 | 72 | 98.61 | Very excellent |
| Rata-rata tiap butir pertanyaan | | | 87.75 | Very excellent |

Table 5 shows learners have positive responsibilities toward learning with the PjBL model and *Instagram* as the media. It could be seen from all learners, 72 participants. The numbers of "yes" on the questionnaire showed that the applied media was "very excellent", with a percentage of 87.75%.

The learners' critical thinking skills of the experimental group were better than the control group. It was due to the applied *PjBL* model with Instagram as the media could make the learners more active and motivate their learning better. The learners could obtain knowledge by exploring the surrounding environment. The learning implementation would motivate learners to be more active and facilitate learners to understand the concepts better by promoting projects than reading materials on books. The uploaded materials to *Instagram* facilitated learners to study the material about invertebrates since they could access *Instagram* anytime and anywhere. Learners were interested due to the figures and videos they watched than the reading texts. The results were in line with a study conducted by Insyasiska, Zubaedah, dan Susilowati (2015). They found that the PjBL model could motivate learners to learn and improve their critical thinking skills.

It was influenced by several factors in the experimental group. The learning process consisted of some stages. The first one was providing questions about the invertebrate concept for the learners. In this case, learners were given animated pictures, Spongebob, and were asked to analyze the name of the animals in the figures. Then, learners were asked to work on the pretest. It consisted of essential questions about invertebrate material. Then, they were asked to answer after promoting the project. In the second meeting, learners arranged the project in groups.

Then, they arranged the schedule to promote the project and to assist the teachers to monitor the project and activities. In the third meeting, the reacher assessed the learners' project products that were uploaded on Instagram. In the fourth meeting, the teachers evaluated the experience. In this case, the teachers provided more explanation about the knowledge obtained by the learners.

The PjBL model implementation with the Instagram media made learners able to construct their knowledge. By finding the invertebrate animals around them, learners would be independent to observe the animals. The learners could find out the morphological features of the animal. Then, they could notice the morphological features to determine the invertebrate classification. They could also determine the names of the animals. They could find out the habitat of the animals, how they moved, and the uses for everyday life.

The experimental group obtained higher results than the control group. It was influenced by the Instagram users of the experimental group. They did the best to carry out the project because they were aware that their project would be uploaded on Instagram. It could improve the motivation and the competitive power of the learners among the group.

The assessment of preservation on the experimental group was higher than the control group. However, the difference between both groups was not significant because, during the preservation activity, the learners understood the instruction excellently. They could access the information about excellent and dry preservation via the Internet easily.

The poster obtained from the experimental group was higher than the control group because of the PjBL with the applied media for the group. Their posters were uploaded to Instagram and assessed by the whole classmates. It made the learners more creative to make posters interested. Thus, their posters would be the best when they uploaded.

The findings were in line with a study by Utami, Riezky, and Umi (2015). They found that PjBL assisted by Instagram influenced the creative thinking skills. The PjBL learning model provided opportunities for learners to investigate, plan, design, and reflect on the project. It was in line with Saefudin (2014) because basically, creativity was the product of creative thinking skills to produce something new. It was to solve problems or situations. In this research, the new thing was a product of preservation and posters of invertebrate animals. The Instagram users as learning

media could add information for learners to improve knowledge. It was a conducive stimulation to develop the creativity of teenagers (Rubiyati et al, 2018).

## CONCLUSION

The results show the PjBL implementation with *Instagram* media on invertebrate material to improve the critical and creative thinking skills of the X SM 2 learners as the control group. It could be proved from the average differences of the learners between before and after the intervention. It was 63.3 and 88.7.

Besides that, the *Project-based learning* model with the *Instagram* media on the material about invertebrate was significantly effective toward the creation of the X SM 2 learners as the experimental group. It was based on the obtained creativity analysis results, 90.1%, with a "very excellent" criterion. The value was higher than the control group. The PjBL model implementation with the Instagram media made learners able to construct their knowledge.

## REFERENCES

Alawiyah, H., Muldayanti, N.D., dan Setiadi, A.E. (2016). Analisis Kesulitan Belajar Peserta didik Dalam Memahami Materi Invertebrata di Kelas X MAN 2 Pontianak. *Jurnal Biologi Education*, *3* (2), 9-20 .

Chiang, C. L. dan H., Lee. (2016). The Effect of Project-Based Learning on Learning Motivation and Problem-Solving Ability of Vocational High School Students. *International Journal of Information and Education Technology*, *6*(9), 709-712.

Daryanto dan Syaiful, K. (2017). *Pembelajaran Abad 21*. Yogyakarta: Gava Media.

Hilyani, H.K. dan Ramdani, D.. (2018). Perbedaan Kemampuan Berpikir Kritis Peserta Didik dengan Model Pembelajaran Think Pair Share (Tps) dan Model Pembelajaran Two Stay Two Stray (Tsts) pada Sub-Materi Invertebrata Filum Echinodermat. *Jurnal Bioedusiana*, *3*(1), 38-44.

*Instagram*, INC. 2020. https://id-id.facebook.com/help/*instagram*/424737657584573. Last Accessed November 27, 2020

Insyasiska, D., Zubaidah, S., dan Susilo, H. (2015). Pengaruh Project Based Learning terhadap Motivasi Belajar, Kreativitas, Kemampuan Berpikir Kritis, dan Kemampuan Kognitif Siswa pada Pembelajaran Biologi. *Jurnal Pendidikan Biologi, 7*(1), 9-21.

Lay, A. dan Osman, K. (2018). Developing 21st Century Chemistry Learning through Designing Digital Games. *JESEH*, *4*(1), 80-92.

Rubiyati, M.A., dan Wicaksono, L. (2018). Pengaruh

Pemanfaatan Media Sosial Instagram Terhadap Kreativitas Belajar Pada Remaja Kelas VII. Junal Pendidikan dan Pembelajaran Khatulistiwa. 7(5), 1-8.

Saefudin, A.A. (2012). Pengembangan Kemampuan Berpikir Kreatif Peserta didik Dalam Pembelajaran Matematika Dengan Pendekatan Pendidikan Matematika Realistik Indonesia (PMRI). Jurnal Al-Bidaya. 4(1), 37-48.

Shin, M. (2018). Effects of Project-based Learning on Students' Motivation and Self-efficacy. *Journal English Teaching*, *73*(1), 95-114.

Snyder, L.G., dan Snyder, M.J. (2008). Teaching Critical Thinking and Problem Solving Skills. *The Delta Epsilon Journal, 1*(2), 90-99.

Utami, R.P., Probosari, R.M., dan Fatmawati, U. (2015). Pengaruh Model Pembelajaran Project Based Learning Berbantu *Instagram* Terhadap Kemampuan Berpikir Kreatif Peserta didik Kelas X Sma Negeri 8 Surakarta. *Jurnal Bio-Pedagogi. 4*(1), 46-52.

Utami, R.P., Probosari, R.M., dan Fatmawati, U. (2015). Pengaruh Model Pembelajaran Project Based Learning Berbantu Instagram Terhadap Kemampuan Berpikir Kreatif Peserta didik Kelas X Sma Negeri 8 Surakarta. Jurnal Bio-Pedagogi. 4(1), 46-52.

Veygid, A., Aziz, S.M, dan Wildan, S.S.R. (2020). Analisis Fitur Dalam *Instagram* Sebagai Media Pembelajaran Online Mata Pelajaran Biologi Untuk Peserta didik Sekolah Menengah Atas. *Alveoli:Jurnal Pendidikan Biologi*, *1*(1), 39-48.

Zubaidah, S. (2016). Keterampilan Abad Ke-21: Keterampilan yang Diajarkan Melalui Pembelajaran. *Seminar Nasional Pendidikan dengan tema "Isu-isu Strategis Pembelajaran MIPA Abad 21*.