

A SYSTEMATIC LITERATURE REVIEW: THE IMPACT OF PROJECT-BASED LEARNING MODEL IMPLEMENTATION ON HIGH SCHOOL STUDENTS' LEARNING OUTCOMES ASSESSED THROUGH VOSViewer IN THE GOOGLE SCHOLAR DATABASE

Trustha Cinantya Putri Tulungagung*

Program Studi Magister Pendidikan Biologi, Universitas Negeri Gorontalo Jl. Jend. Sudirman No.6, Dulalowo Timur, Kec. Kota Tengah, Kota Gorontalo, Gorontalo 96128.

*Corresponding Author: ainidjafar23@gmail.com

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ABSTRACT

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Education involves the dynamic exchange between educators and students in the instructional context. Conversely, project-based learning represents an instructional paradigm that integrates projects into the learning journey, with these projects encompassing both individual and group undertakings. Collaboratively pursued within defined temporal boundaries, such projects culminate in concrete outcomes. This study seeks to investigate the potential impact of project-based learning approaches on the participation of secondary school students. The systematic literature review method is employed to comprehensively evaluate existing research in this domain. By exploring the effects of project-based learning, the study sheds light on its role in enhancing student engagement and learning outcomes. This investigation contributes to the ongoing discourse on innovative pedagogical strategies and their efficacy in the context of modern education.

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INTRODUCTION

Education is often associated with the interactive process between students and educators during the educational endeavor. In a narrow context, education signifies the process of students learning within a school setting as a form of formal education. As stipulated in Article 3 of Law Number 20 of 2003 concerning National Education, "National education, aimed at developing capabilities and shaping character and civilization of a dignified nation to enlighten the nation's life, aims for the development of learners' potentials to become individuals who are faithful and devout to the One Almighty God, possess noble morals, are healthy, knowledgeable, capable, creative, independent, and responsible citizens in a democratic society." Derived from this law, education can be construed as an effort to guide children's growth into responsible adults capable of self-accountability. To assume self-responsibility, students must learn to cultivate their talents, interests, and social skills in order to apply values within their societal roles.

To nurture these potentials, meaningful learning experiences are crucial for students. According to Davis Ausubel (Asbar & Witarso, 2020), meaningful learning is a process where new information is linked with an individual's existing cognitive framework. This is evident in the formation of concepts within a student's cognitive structure. To facilitate meaningful learning, instruction must not be arbitrary and irresponsible. Implementing suitable models, approaches, methods, and instructional strategies is expected to actively and innovatively engage students, enhancing the quality of meaningful learning. Through such meaningful learning, students recognize the significance of education, educational objectives, critical thinking skills, and responsiveness in problem-solving.

As stated by Sudrajat (2008), a teaching model emerges when teaching approaches, strategies, methods, techniques, and even tactics are seamlessly integrated. An approach represents the general perspective on the teaching process, forming the backdrop of instruction. Teaching approaches are categorized into two orientations: student-centered and teacher-centered approaches. Meanwhile, instructional strategies (Anitah, 2013) encompass chosen methods for delivering subject matter within a specific learning context, including the nature, scope, and sequence of activities that provide learning experiences to students. Teaching methods are the vehicles used to execute pre-designed plans, while teaching

techniques are specific methods for implementation.

Therefore, a teaching model encapsulates the entirety of the teaching process, from inception to conclusion. According to Jagantara et al. (2014), the teacher-centered instructional model should be promptly abandoned and transformed into an active and independent learning model based on modern cognitive principles, fostering the active and creative role of students (student-centered). This implies that students assume a central role in learning, with the teacher not being the sole dominant source of learning. A model that supports active student participation is Project-Based Learning. Project-Based Learning is an instructional model involving projects within the learning process, which can be individual or group projects executed collaboratively within a specific timeframe, resulting in a final product (Jagantara et al., 2014).

Teaching Models

Teaching models are approaches employed by teachers or educators to establish interactions (interactions) with students during the instructional process (Eliza et al., 2019). Teaching models encompass approaches, strategies, methods, techniques, and tactics. These elements need to be planned and organized based on the subject matter to be taught, objectives, and competencies to be achieved, both during and after the learning process.

Project-Based Learning Model

One goal of the Project-Based Learning (PBL) model is a teaching method that employs projects or activities as mediums (Eliza et al., 2019). Students are required to actively engage in exploration, assessment, or synthesis to produce learning outcomes. The teacher's role, besides being a guide, is that of a facilitator and manager of the learning process involving projects. The project work or activities provide students the space to search for and resolve problems, ultimately leading to the creation of presentable products. As a result, students become more independent in designing, problem-solving, decision-making, and investigative activities.

METHOD

This article employs the Systematic Literature Review (SLR) research method, which constitutes a form of literature review involving the identification, examination, evaluation, and interpretation of the reviewed studies. The author collected articles from Google Scholar using the

assistance of the Publish or Perish Software. The approach utilized is the co-occurrence analysis approach to identify relevant articles. The scholarly articles or journals used as data in this study were published within the range of 2018 to 2022, employing the keywords "project-based learning model, learning outcomes, high school."

RESULTS AND DISCUSSION

Limited Field Test

Students' Creative Thinking Skills

The assessment of students' creative thinking ability test results was conducted in both the limited field trial and the extensive field trial, each carried out during the first to third sessions. Similar to other studies, the analysis of students'

creative thinking tests included pretests and post-tests for each session.

Based on the analysis of creative thinking skills test results for students in the limited field trial class, which covered sessions 1 to 3, a total of 10 students participated. In the pretest results, students' creative thinking skills aligned with the indicators of creative thinking: fluency at 47.4%, flexibility at 32.5%, originality at 42.5%, and elaboration at 30%. In contrast, in the post-test, students' creative thinking skills according to the indicators were fluency at 80%, flexibility at 65%, originality at 70%, and elaboration at 72.5%. The following graph illustrates the assessment results of the creative thinking skills learning outcome test in the limited field trial.

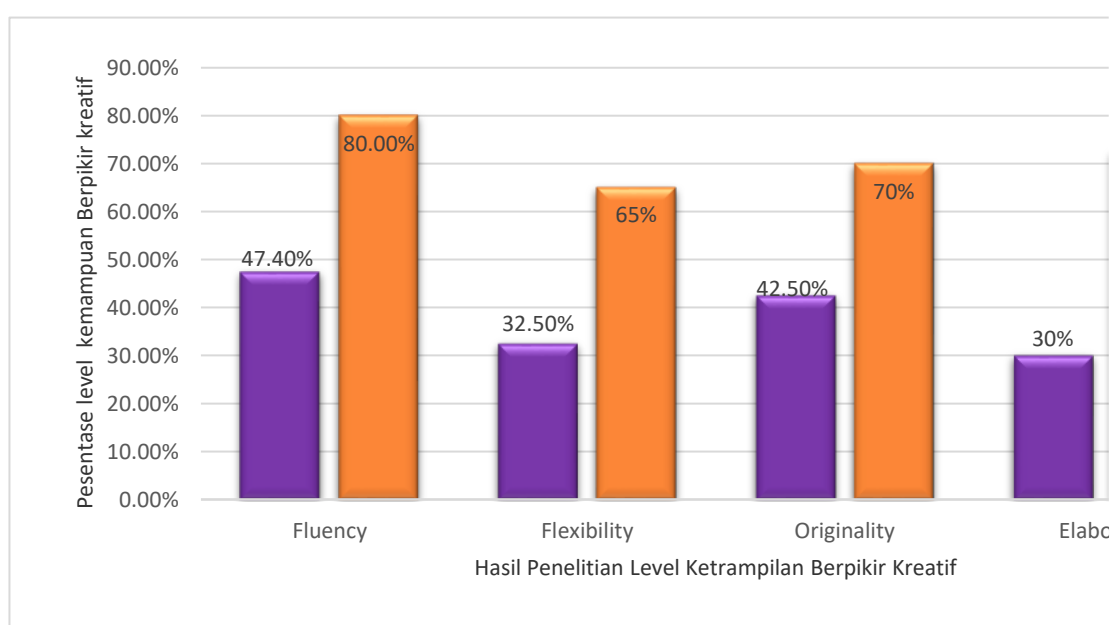


Figure 1. Graph of the results of the Limited Scale Test Creative Thinking skills assessment

Table 1. N-Gain Analysis of Creative Thinking Skills Limited Scale Test

Indicators of creative thinking	Score			Category
	Pre-test	Post-test	N-gain	
Fluency	47,4	80	0,6	Moderate
Flexibility	32,5	65	0,5	Moderate
Originality	42,5	70	0,4	Moderate
Elaboration	30	72,5	0,7	Moderate

Based on the data in Figure 1, the test of creative thinking ability is highly significant. This is supported by the statement from Treffinger et al. as cited in Irwandi (2020), which asserts that the creative thinking test generates numerous ideas (fluency), diverse new ideas (flexibility),

uncommon new ideas (originality), and enriches interesting and complex ideas (elaboration). This significant increase is attributed to factors such as the students' enthusiasm in participating in the learning process and the conducive classroom environment that supports active learning. As a

result, the scores in the creative thinking test have improved.

Student Response

A student response questionnaire was administered to gather data on students' perceptions during the learning process utilizing the project-based learning model with a STEM approach. The responses were categorized into "YES/NO" answers on the questionnaire, and a total of 10 respondents participated in the limited-scale pilot. The calculated criterion score for student responses was 97, with a Student Response Percentage of 87% in the limited-scale pilot. This score determines the category of student response assessment, placing the overall criterion score for student response within the range of 86-100%, which falls under the "Very Good" category.

N-Gain Analysis Results

The analysis of pre-test and post-test results from students' assessments was used to calculate

the N-Gain values, indicating the improvement in students' creative thinking skills. The N-Gain analysis results are presented in Table 1. The calculated N-Gain values for the fluency indicator were 0.6, for flexibility 0.5, for originality 0.4, and for elaboration 0.7. These values fall within the "moderate" category, indicating that the project-based learning model with a STEM approach is moderately effective in enhancing students' creative thinking skills. This finding is in line with previous research by Riyanti (2020), which demonstrated that the integration of web-based STEM-oriented PjBL learning tools can moderately enhance students' creative thinking abilities.

RESULTS AND DISCUSSION

The obtained results amount to approximately 980 journals. The author applied a criterion of selecting at least 10 journals with the highest citations for analysis. Subsequently, the VosViewer software was employed to map the outcomes.

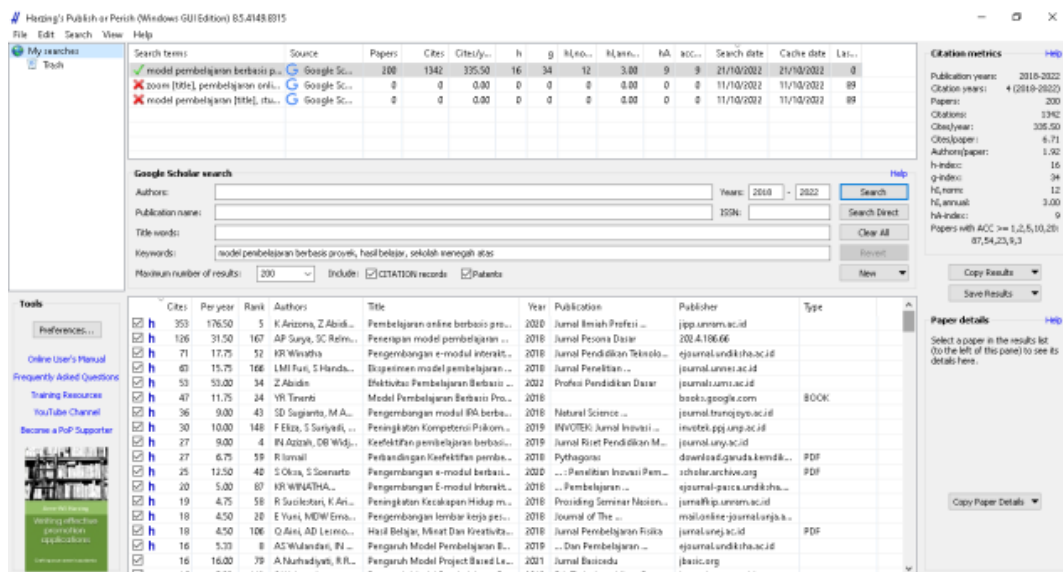


Figure 1. Article results using *Publish or Perish*

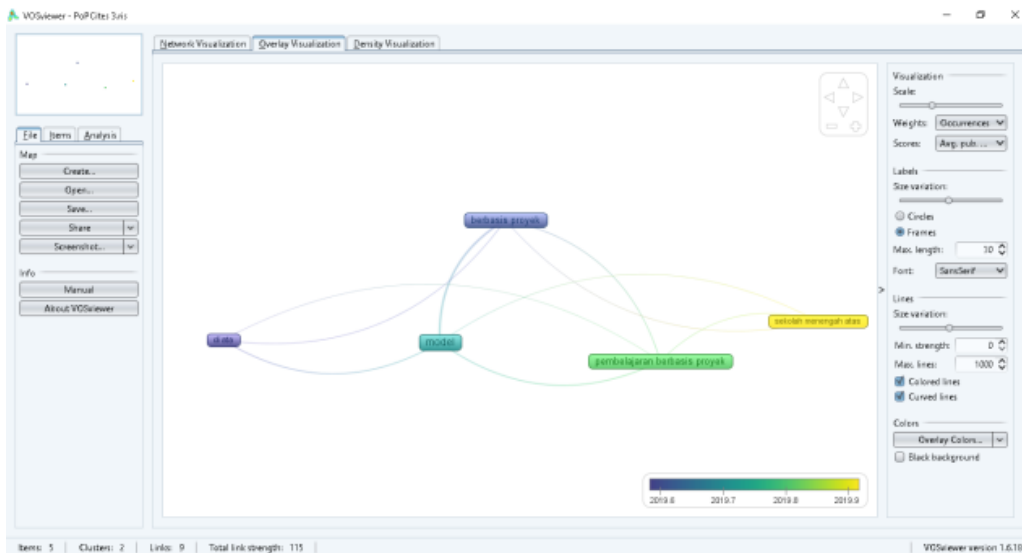


Figure 2. Mapping Results of VOSviewer Bibliometric Analysis

The following presents the outcomes of the search conducted using the Publish or Perish software, along with the selection of the top 10 most cited journals (Figure 3). It becomes apparent that research related to project-based learning models within the period of 2018-2022 in

the Google Scholar database has shown a gradual decline, with the year 2021 demonstrating the highest count of journals. The subsequent table outlines the results of the journal search categorized by their yearly quantities (Table 1).

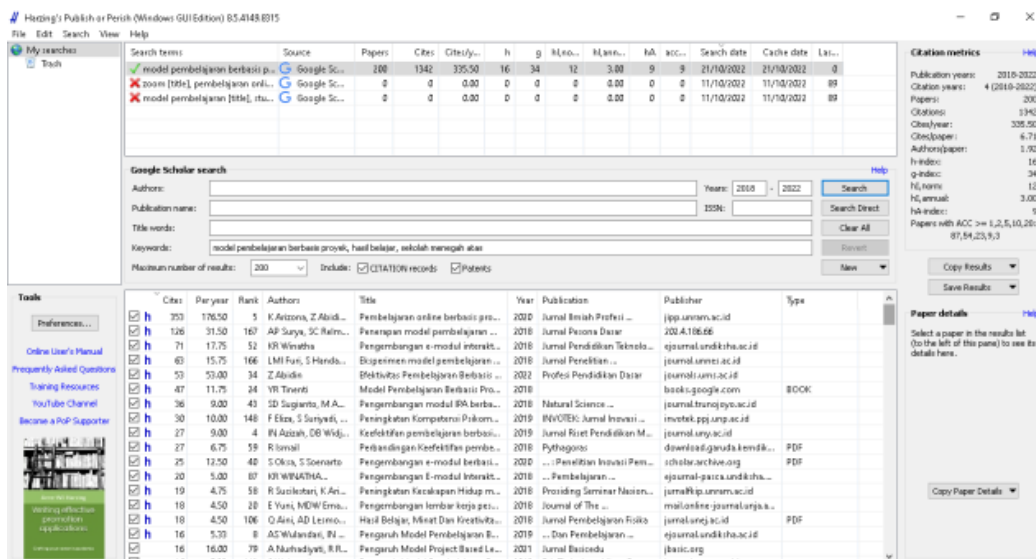


Figure 3. Search Results after Being Sorted by Highest Citations

Table 1. Journal Search Results Based on Quantity Each Year

Year of Publication	Number of articles	Percentage
2018	48	24%
2019	46	23%
2020	35	17,5%
2021	50	25%
2022	20	10%

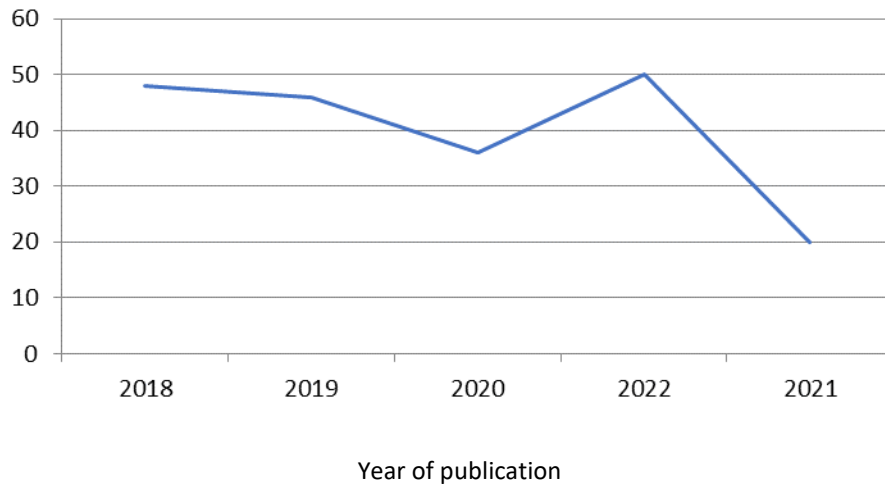


Figure 4. Research Interest in Learning Outcomes or Project-Based Learning Models in High Schools

Table 2. Scholarly Journals Ranked by Citation Count from Highest to Lowest, from 2018 to 2022

No.	Number of citations	Author	Title	Year	Journal
1	353	Arizona, K, Abidin, Z, & Rumansyah, R (Arizona et al., 2020)	Pembelajaran online berbasis proyek salah satu solusi kegiatan belajar mengajar di tengah pandemi covid-19.	2020	<i>Jurnal Ilmiah Profesi</i>
2	126	Surya, AP, Relmasira, SC, & Hardini (Surya et al., 2018)	Penerapan model pembelajaran project-based learning (PjBL) untuk meningkatkan hasil belajar dan kreatifitas siswa	2018	
3	71	KR Winatha (Winatha et al., 2018)	Pengembangan e-modul interaktif berbasis proyek mata pelajaran simulasi digital	2018	Jurnal Pendidikan Teknologi Dan Kejuruan
4	63	LMI Furi, S Handayani (Meita et al., 2018)	Eksperimen model pembelajaran project-based learning dan project-based learning terintegrasi stem untuk meningkatkan hasil belajar dan kreativitas siswa	2018	Jurnal Penelitian Unnes
5	53	Z Abidin (2022) (Abidin, 2020)	Efektivitas Pembelajaran Berbasis Masalah, Pembelajaran Berbasis Proyek Literasi, dan Pembelajaran Inkuiri dalam Meningkatkan Kemampuan Koneksi Matematis	2022	
6	47	YR Tinenti (Yanti Rosinda Tinenti, 2021)	Model Pembelajaran Berbasis Proyek (PBP) dan Penerapannya dalam Proses Pemelajaran di Kelas	2018	
7	36	SD Sugianto, M Ahied, WP Hadi ... (Sugianto et al., 2018)	Pengembangan modul IPA berbasis proyek terintegrasi STEM pada materi tekanan	2018	
8	30	F Eliza, S Suriyadi, DTP Yanto (Eliza et al., 2019)	Peningkatan Kompetensi Psikomotor Siswa Melalui Model Pembelajaran Project	2019	INVOTEK: Jurnal Inovasi

9	27	IN Azizah, DB Widjajanti (2019) (Azizah & Widjajanti, 2019)	Based Learning (PjBL) di SMKN 5 Padang Keefektifan pembelajaran berbasis proyek ditinjau dari prestasi belajar, kemampuan berpikir kritis, dan kepercayaan diri siswa	2019	Jurnal Riset Pendidikan Matematika, journal.uny.ac.id
10	27	R Ismail 2018 (Ismail, 2018)	Perbandingan Keefektifan pembelajaran berbasis proyek dan pembelajaran berbasis masalah ditinjau dari ketercapaian tujuan pembelajaran	2018	Pythagoras, download.garuda.kemdikbud.go.id

The data processing of the 10 articles selected as literature sources using VOSViewer reveals 5 interrelated keywords organized into 6 distinct clusters. The visualization results from

VOSViewer indicate that among all the utilized literature, the keyword "project-based" dominates, interlinking with other keywords such as model, project-based learning, and high school.

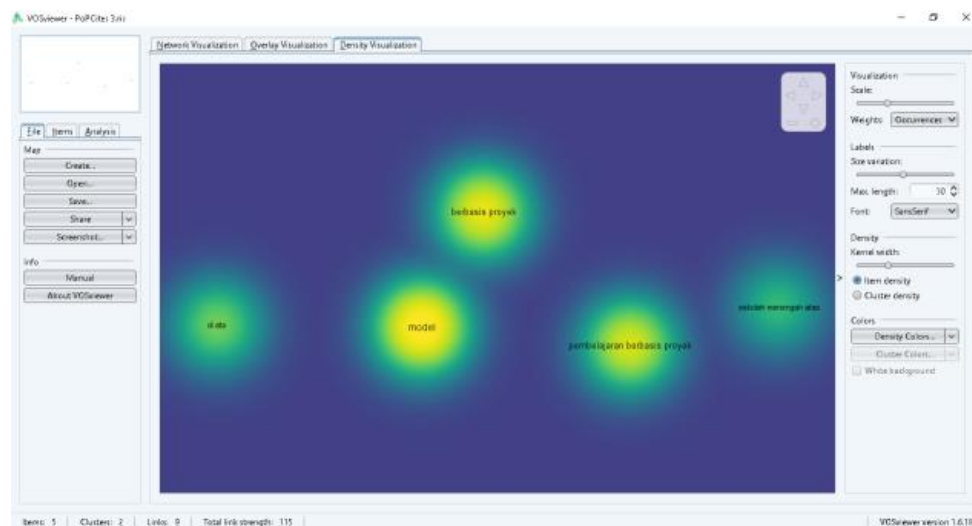


Figure 5. Density Visualization of VOSViewer

CONCLUSION

The research results indicate the quality of the products generated based on the effectiveness aspects of the project-based learning model with a STEM approach, as demonstrated by the percentage of N-Gain values showing an average increase in creative thinking skills falling within the range of $0.3 < g < 0.7$, which falls under the moderate category. Meanwhile, the participants' responses through the questionnaire yielded an average score of 87% for the limited trial and an improved average score of 85.8% for the extensive trial. This suggests that the students have shown a positive response to the learning process. Based on the research findings, it can be concluded that

the development of the instructional approach using the project-based learning model with a STEM approach has been effective in enhancing the creative thinking skills of the students.

REFERENCES

- Abidin, Z. (2020). Efektivitas Pembelajaran Berbasis Masalah, Pembelajaran Berbasis Proyek Literasi, Dan Pembelajaran Inkuiri Dalam Meningkatkan Kemampuan Koneksi Matematis. *Profesi Pendidikan Dasar*, 7(1), 37–52. <https://doi.org/10.23917/ppd.v7i1.10736>
- Anitah, S. (2013). Strategi Pembelajaran. In *Strategi Pembelajaran* (Vol. 2, Issue 2).

- Arizona, K., Abidin, Z., & Rumansyah, R. (2020). Pembelajaran Online Berbasis Proyek Salah Satu Solusi Kegiatan Belajar Mengajar Di Tengah Pandemi Covid-19. *Jurnal Ilmiah Profesi Pendidikan*, 5(1), 64–70. <https://doi.org/10.29303/jipp.v5i1.111>
- Asbar, R. F., & Witarsa, R. (2020). KAJIAN LITERATUR TENTANG PENERAPAN PEMBELAJARAN TERPADU DI SEKOLAH DASAR. *News.Ge*, 3, <https://news.ge/anakliis-porti-aris-qveynis-momava>. <https://journal.universitaspahlawan.ac.id/index.php/jrpp/article/view/1220/964>
- Azizah, I. N., & Widjajanti, D. B. (2019). Keefektifan pembelajaran berbasis proyek ditinjau dari prestasi belajar, kemampuan berpikir kritis, dan kepercayaan diri siswa. *Jurnal Riset Pendidikan Matematika*, 6(2), 233–243. <https://doi.org/10.21831/jrpm.v6i2.15927>
- Eliza, F., Suriyadi, S., & Yanto, D. T. P. (2019). Peningkatan Kompetensi Psikomotor Siswa Melalui Model Pembelajaran Project Based Learning (PjBL) di SMKN 5 Padang. *INVOTEK: Jurnal Inovasi Vokasional Dan Teknologi*, 19(2), 57–66. <https://doi.org/10.24036/invotek.v19i2.427>
- Ismail, R. (2018). Perbandingan keefektifan pembelajaran berbasis proyek dan pembelajaran berbasis masalah ditinjau dari ketercapaian tujuan pembelajaran. *Pythagoras: Jurnal Pendidikan Matematika*, 13(2), 181–188. <https://doi.org/10.21831/pg.v13i2.23595>
- Jagantara, I. W. M., Adnyana, P. B., & Widiyanti, N. P. (2014). Pengaruh Model Pembelajaran Berbasis Proyek (Project Based Learning) Terhadap Hasil Belajar Biologi Ditinjau Dari Gaya Belajar Siswa SMA. *E-Journal Program Pascasarjana Universitas Pendidikan Ganesha Program Studi IPA*, 4(1), 1–13.
- Meita, L., Furi, I., Handayani, S., & Maharani, S. (2018). Eksperimen Model Pembelajaran Project Based Learning Dan Project Based Learning Terintegrasi Stem Untuk Meningkatkan Hasil Belajar Dan Kreativitas Siswa Pada Kompetensi Dasar Teknologi Pengolahan Susu. *Jurnal Penelitian Pendidikan*, 35(1), 49–60–60. <https://doi.org/10.15294/jpp.v35i1.13886>
- Sudrajat, A. (2008). Pengertian pendekatan, strategi, metode, teknik, taktik, dan model pembelajaran. Tersedia: <http://Akhmadsudrajat.Wordpress.Com/2008/09/12/Pengertian-Pendekatan-Strategi-Metode-Teknik-taktik-Dan-Model-Pembelajaran/>. [20 Oktober 2008], 1.
- Sugianto, S. D., Ahied, M., Hadi, W. P., & Wulandari, A. Y. R. (2018). Pengembangan Modul Ipa Berbasis Proyek Terintegrasi Stem Pada Materi Tekanan. *Natural Science Education Research*, 1(1), 28–39. <https://doi.org/10.21107/nser.v1i1.4171>
- Surya, A. P., Relmasira, S. C., & Hardini, A. T. A. (2018). PENERAPAN MODEL PEMBELAJARAN PROJECT BASED LEARNING (PjBL) UNTUK MENINGKATKAN HASIL BELAJAR DAN KREATIFITAS SISWA KELAS III SD NEGERI SIDOREJO LOR 01 SALATIGA. *Jurnal Pesona Dasar*, 6(1), 41–54. <https://doi.org/10.24815/pear.v6i1.10703>
- Winatha, K. R., Suharsono, N., & Agustin, K. (2018). Pengembangan E-Modul Interaktif Berbasis Proyek Matematika. *Jurnal Pendidikan Teknologi Dan Kejuruan*, 4(2), 188–199. <https://ejournal.undiksha.ac.id/index.php/JPTK/article/viewFile/14021/9438>
- Yanti Rosinda Tinenti. (2021). Model Pembelajaran Berbasis Proyek (PBP) dan Penerapannya dalam Proses Pembelajaran kelas. September.