



Analysis of Students' Creative Thinking Skills and Learning Motivation in Science Subjects at State Primary School

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Abstract

Teachers have to offer learning opportunities that encourage the development of students, given the students' relatively limited creative thinking skills and motivation to learn. This study aims to identify the categories of creative thinking skills and learning motivation exhibited by students in relation to each indicator within the field of electrical engineering. This study employed a quantitative descriptive approach, with a sample size of 27 students from 6 grades of SD Negeri Mangkang Kulon 02 Semarang in the 2023/2024 academic year. The data were obtained through the observation guidelines, questionnaires and document analysis, which the researchers meticulously prepared and developed. Based on the descriptive qualitative analysis, the overall rating for creative thinking skills was 68.94%, indicating a moderate level of proficiency. In the descriptive qualitative analysis, each creative thinking skills indicator achieved a maximum of 80.55%, which was classified as high, while the minimum was 60.19%, which was categorized as low. The overall motivation of the students was found to be 72.66%, which is classified as high motivation. The maximum percentage of students' motivation to learn was 79.26%, classified as high motivation, while the minimum percentage was 60.00%, considered sufficient motivation. The results of this study indicate that students at SD Negeri Mangkang Kulon 02 Semarang exhibit low levels of creative thinking skills and moderate levels of motivation in electrical engineering.

Keywords: creative thinking skills; electricity; learning motivation; science learning

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INTRODUCTION

Individuals who possess emotional creativity can employ their cognitive abilities to demonstrate potential outcomes, propose evidence-based updates, and present facts relating to a particular issue (Kuška et al., 2020; Parke

et al., 2015; Prayogi et al., 2021; Yenti & Suaedi, 2022). Education is, therefore, a fundamental basis for developing human resources of the highest quality, capable of creative, critical and independent thinking (Al-Dulaimi, 2016; Syamsurijal, 2023). In order to prepare students for



success in the 21st Century, the education system must be capable of providing them with challenges that are tailored to their unique needs, as well as rational and creative. In addition, students are expected to be motivated to develop their talents and interests (Liem & Chua, 2021; Sari & Suhaili, 2020).

Creative thinking skills can be defined as the ability to solve problems rationally by using diverse methods (Azis, 2018; Good, 2024; Suyidno et al., 2019). Individuals with creative thinking skills can be innovative by applying new ideas from their cognitive processes (Saregar et al., 2021; Wahyuni & Kurniawan, 2018). Four indicators of creative thinking skills are fluency, flexibility, originality, and elaboration (Munandar, 2016). Therefore, creative thinking skills are crucial in education, especially science.

Learning motivation can be classified into two categories: intrinsic motivation and extrinsic motivation. The characteristics of each motivation group are as follows: (a) the desire and aspiration to succeed; (b) the motivation and need to learn; (c) the hope and aspiration for the future; (d) the reward in learning; (e) the interesting activities in learning; and (f) the conducive learning environment (Uno, 2023). Intrinsic motivation comprises the initial three indicators, while extrinsic motivation comprises the final three.

Science and technology are the outcomes of integrating the science and social studies curriculum, which are currently taught as distinct subjects (Tarsini & Ningsih, 2021). The science curriculum includes the study of social interactions between living organisms in the universe (Azzahra et al., 2023; Erduran, 2023). The science curriculum emphasizes cognitive and skill development through a flexible learning approach (McGarry et al., 2015; Priantini et al., 2022).

The interviews demonstrated that creative thinking skills are critical.

However, not all aspects are optimized in the teaching process. Teachers' understanding of creative thinking skill is limited to novel problem-solving approaches and generating new ideas (Aktas, 2016; Tapinos, 2016; Wicaksono et al., 2022). Despite the fact that teachers incorporate creative thinking skills into their lesson plans, their implementation in the classroom still needs to be improved. Teachers face various challenges in developing creative thinking, including inadequate technology, limited resources and low teacher competence. To overcome these problems, teachers should value students' ideas, stimulate creativity during lessons, and provide constructive responses to students' questions and answers (Ni'mah, 2022).

Numerous studies have identified a need for more learning motivation and creative thinking skills among students. MZ et al. (2024) observed that the creative thinking skills of fifth-grade students at MIM 16 Karangasem Paciran Lamongan were relatively limited. Only one of the four indicators of creative thinking abilities that were evaluated was classified as creative. Similar results were reported by Fakhirah et al. (2023), namely that the analysis of indicators of creative thinking skills yielded results that fell within the medium and low criteria. Consequently, students in class IV SDN 36 Cakranegara exhibited a disparity in their creative thinking skills in science. The results of Nugroho (2020) research indicate that 20% of students were in the very good category, 52% were in the good category, 16% were in the less good category, and 8% were in the bad category.

The significance of creative thinking skills and motivation in learning science has been previously emphasized. This is evidenced by the considerable number of studies that have addressed this topic. Nevertheless, prior research has concentrated solely on one aspect, and

this study endeavours to enhance the current body of literature by integrating both aspects within the context of scientific education.

Education experts have reached a consensus that implementing suitable pedagogical strategies can facilitate the development of creative thinking skills. As posited by (Ambrose & Sternberg, 2016) , an approach that encourages students to solve problems and engage in collaborative projects independently may enhance their creativity. The research results indicate that project-based learning (PBL) and the STEM approach have been demonstrated to be effective in enhancing students' creative thinking skills (Henriksen, 2017). This enhancement results from students being encouraged to think in a divergent manner, pursue innovative solutions, and connect knowledge from a variety of scientific disciplines in order to address real-world issues.

Conversely, motivation to learn can also be enhanced through appropriate treatment. Ryan & Deci (2018) elucidate that intrinsic motivation theory posits that fulfilling students' fundamental needs, such as autonomy, competence, and relatedness, will enhance their learning motivation. The study by Schunk and DiBenedetto (2020) also indicates that using positive feedback and clear goal-setting in instructional strategies can enhance students' motivation. Considering these aspects in improving learning outcomes is crucial, as creative thinking skills and high motivation contribute to better academic achievement.

Further research is required to comprehend the actual conditions in the classroom, given the significance of motivation and creative thinking skills in

the learning process. Consequently, the researcher is interested in conducting research titled "Analysis of students' creative thinking skills and learning motivation in science subjects at state primary school". This study aims to identify the category of creative thinking skills and student learning motivation for each indicator of electricity material. Therefore, it is anticipated that teachers can plan relevant lessons to improve students' creative thinking skills and learning motivation in electrical materials.

METHOD

Qualitative research design with a natural observation approach effectively understands phenomena in an authentic context without researcher intervention. Through this approach, the researchers observed the behaviours and interactions of participants in their natural environment, which generated rich and in-depth data. This method is particularly useful in education, as researchers can record interactions between teachers and students and students' creative thinking skills and learning motivation. With this observation, researchers identified patterns and trends not revealed through other methods, making a significant contribution to developing theory and practice in the field of study.

This research involved 27 sixth-grade students at SD Negeri Mangkang Kulon 02 Semarang. The objective was to examine students' creative thinking skills and motivation to learn about electricity. The study was conducted during the second semester of the 2023/2024 academic year. The instruments employed by the researchers in this study are presented in Table 1.

Table 1 Research instruments

| Instrument | Aspect | Description Instrument |
|------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Observation of creative thinking skills. | Activities that stimulate Creative Thinking Skills (fluency, flexibility, originality, and elaboration). | Observing teacher and student interactions during learning, as well as student responses to learning. |

| Instrument | Aspect | Description Instrument |
|--------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------|
| Student learning motivation questionnaire. | Questionnaire that includes six indicators of Student Learning Motivation. | Via the google form link. |
| Document Analysis. | Observation results of Creative Thinking Skills and Learning Motivation questionnaire results. | Using bar charts. |

The procedures employed by the researchers to analyse the collected data encompass four stages. The initial stage in the data collection process is observation, followed by distributing questionnaires to the samples' class via Google Forms and analysing field notes to gain insight into creative thinking skills. The second step is data reduction, whereby the researchers select and focus on the most pertinent aspects of the data. The third step is data presentation, whereby the researchers employ clear images to facilitate comprehension. Finally, the researchers derived conclusions by examining the validity of the research data, supported by valid evidence.

A data analysis was conducted to assess creative thinking skills. This entailed evaluating the results of observations pertaining to creative thinking skills, as delineated in Table 2. Table 2 Categories of creative thinking skills

| Total Score Range (%) | Creative Thinking Skills Category |
|------------------------------|------------------------------------------|
| 90.00 ≤ P ≤ 100 | Very High |
| 80.00 ≤ P < 90.00 | High |
| 65.00 ≤ P < 80.00 | Moderate |
| 55.00 ≤ P < 65.00 | Low |
| P < 55.00 | Very Low |

(Supriyono, 2023)

A data analysis was performed to determine the degree to which students were motivated to learn. This was accomplished by assessing the responses to the questionnaire, which was accessible through a Google Form link. The results are presented in Table 3,

which illustrates the range of values obtained.

Table 3 Categories of creative thinking skills

| Total Score Range (%) | Student Learning Motivation Category |
|------------------------------|---------------------------------------------|
| < 20.00 | Very Low Motivation |
| 21.00 – 40.00 | Low Motivation |
| 41.00 – 60.00 | Moderate Motivation |
| 61.00 – 80.00 | High Motivation |
| 81.00 – 100 | Very High Motivation |

The following is a tabular representation of the results of the observations, questionnaire distribution, and document analysis conducted to determine the creative thinking skills and learning motivation of Year 6 students in the science and sciences subject at SD Negeri Mangkang Kulon 02 Semarang. This presentation encompasses aspects of questions and activities that stimulate creative thinking skills (fluency, flexibility, authenticity, and elaboration). The results of each indicator of creative thinking skills are shown in Table 4.

Table 4 Results of achievement of each indicator of creative thinking skills

| Indicator | Percentage | Criteria |
|------------------|-------------------|-----------------|
| Fluency | 80.55% | High |
| Flexibility | 72.53% | Moderate |
| Originality | 62.50% | Low |
| Elaboration | 60.19% | Low |

The table presented in the results of the observation of students' creative thinking skills indicates that the overall creative thinking skills of the 6 grade of

SD Negeri Mangkang Kulon 02 Semarang are in the medium category, with a percentage of 68.94%. The fluency indicator was classified as high in the category of creative thinking skills, with a percentage of 80.55%, as indicated by the results of each indicator. The flexibility indicator was classified as medium, with 72.53%. Conversely, the

originality indicator was classified within the low category, with a percentage of 62.50%. Furthermore, the elaboration indicator was classified as low, with a percentage of 60.19%.

Table 5 presents the results of the distribution of the learning motivation questionnaire via the Google Form link.

Table 5 Achievement results for each learning motivation indicator

| Indicator | Percentage | Criteria |
|---------------------------------------------------------------------------|------------|-----------------|
| There is a desire to succeed (question number 1). | 79.26% | High Motivation |
| There is encouragement and a need for learning (questions 2 and 3). | 79.26% | High Motivation |
| There are hopes or aspirations for the future (questions number 4 and 5). | 72.59% | High Motivation |
| There is appreciation and rewards in learning (question number 6). | 60.00% | High Motivation |
| There are interesting learning activities (questions number 7 and 8). | 69.26% | High Motivation |
| A conducive learning environment exists (questions 9 and 10). | 75.56% | High Motivation |

A review of the results of the Student Learning Motivation Questionnaire, as distributed via Google Form link, revealed that the overall learning motivation of the 6 grade of SD Negeri Mangkang Kulon 02 Semarang was 72.66%, indicating a high level of motivation. The analysis results indicate that the indicators of desire to succeed are included in the high motivation category, with a percentage of 79.26%. Similarly, the indicators of encouragement and the need for learning are also included in the high motivation category, with a percentage of 79.26%. Moreover, the indicator of hope or aspirations for the future is also included in the high motivation category, with a percentage of 72.59%. The remaining indicators, namely those of rewards in learning (72.59%), interesting activities in learning (60.00%), and a conducive learning environment (75.56%), were found to fall within the moderate category.

This study aims to ascertain the level of creative thinking skills and learning motivation exhibited by sixth-grade

students of SD Negeri Mangkang Kulon 02 Semarang in relation to electrical subjects, both in aggregate and for each indicator. Based on observational data collected from sixth-grade students at SD Negeri Mangkang Kulon 02 Semarang, students' overall creative thinking ability was 68.94%, which is in the moderate range. This indicates that there is still room for improvement, especially in certain areas, although the students have decent creative thinking skills.

The fluency indicator reached 80.55%, which is categorized as high. This shows that the majority of students have the skill to generate a large number of ideas or solutions to a given problem. This skill is crucial because fluency in thinking is the basis for creative thinking (Budiyono et al., 2022; Putri et al., 2017). Students who can think fluently are more likely to identify many potential solutions to a problem, which is a critical foundation for developing creativity (Ardiansyah & Sunaringtyas, 2016; Rubenstein et al., 2020).

The school has implemented strategies that can serve as case studies for other educational institutions to attain high results in this indicator. Practical activities, such as constructing electrical circuits, are one of the primary learning strategies teachers implement. This activity aims to facilitate students' comprehension of the subject matter and develop their practical abilities, both in group settings and individually. Teachers also consistently offer clear instructions and directives to students with difficulty constructing electrical circuits, ensuring the practice is completed properly and accurately. Furthermore, teachers emphasize the significance of independent comprehension and practical abilities, as the skill of constructing electrical circuits has direct applications in everyday life. This approach, which integrates practice and contextual learning, not only enhances students' cognitive flexibility but also provides them with a more profound understanding of real-life issues.

Additionally, the elaboration indicator was found to be in the low category, with a percentage of 60.19%. The elaboration indicator measures students' skills to develop ideas further and elaborate on the intricate details of their design solutions. The low results for this indicator suggest that students continue to experience challenges in developing ideas into more intricate and structured concepts or solutions (Kurnia, 2021). This may be due to a need for more practice or understanding in developing and explaining their ideas in depth. To improve this skill, students need more tasks that necessitate the in-depth development of ideas and the further exploration of the concepts they generate.

A variety of potential development avenues can be pursued to improve the unsatisfactory performance of the elaboration indicators, as determined by the results of pertinent research studies.

As Umam & Jiddiyah, (2021) have observed, providing project-based assignments emphasising detailed exploration and development of ideas can enhance students' elaboration skills. Project-based learning allows students to delve more profoundly into the concepts they are studying and devise more structured solutions. Furthermore, providing constructive feedback from teachers on students' idea development is also crucial in enhancing elaboration skills (Santoso & Wulandari, 2020). This feedback can be in the form of suggestions or guidance on further developing ideas and integrating various elements into a more comprehensive solution. It is anticipated that students will be more proficient in developing their concepts into more intricate and detailed solutions as a result of implementing these strategies.

The results of this study agree with those of prior research, suggesting that primary school students' creative thinking skills frequently develop in a non-uniform manner (Kau, 2017). Each indicator of creative thinking skills has the potential to develop at different rates, depending on the learning environment, teaching methodology, and external stimuli experienced by students (Mahfud, 2017).

The results also showed that although the students demonstrated proficiency in critical thinking, they needed to improve their self-expression and articulation skills. Therefore, teachers and the school environment should create opportunities for students to participate in activities that foster the further development of their ideas and creative thinking skills.

The motivation questionnaire administered to 6 grades of SD Negeri Mangkang Kulon 02 Semarang revealed an overall motivation score of 72.66%, indicating a high level of motivation. The results indicate that, in general, students demonstrate a high level of motivation to learn, although there is some variation in

the indicators analyzed. The aspiration and desire for success indicator achieved a percentage of 79.26%, which is classified as high motivation. This indicates that the students have a strong desire to succeed academically. Motivation is an essential factor that serves as the primary motivator that motivates students to work harder, surmount obstacles, and accomplish their academic objectives. Aspirations for success are often associated with high self-expectations and support from immediate environments, including educators, family members, and peers.

The school's endeavours to cultivate a strong sense of aspiration and a desire for success may be used as a case study for readers interested in this topic. The teachers at this school consistently inspire students by emphasizing the significance of the IPAS material in their daily lives. In addition to utilizing textbooks, Teachers enrich students' knowledge with new and up-to-date information by providing references from alternative sources, including supplementary books and the internet. This approach encourages students to continue learning and acquire broader knowledge. Furthermore, teachers endeavour to alter students' mindsets by instilling the importance of their active role in the surrounding environment through IPAS-based learning. This method aids students in recognizing the relevance of the material they are studying to real life, fostering a greater sense of enthusiasm and commitment to their learning.

The reward indicator in learning is classified as a moderate motivator, with an intensity of 60.00%. These results indicate that students' motivation, influenced by incentives, is not as strong as the other indicators. It has been demonstrated that incentives can enhance students' motivation, whether through praise, grades, or rewards. However, the findings of the study indicate that

students' intrinsic motivation (driven from within) is more predominant than their extrinsic motivation (driven from without, such as incentives) (Cigan, 2014). Nevertheless, the role of incentives remains significant, particularly in reinforcing positive behaviours and acknowledging students' efforts.

Several prospective strategies can be implemented to improve motivation influenced by rewards or incentives, as determined by pertinent research results. As demonstrated by the research conducted by Ryan & Deci, (2018), integrating external incentives with intrinsic motivation through providing responsibility and autonomy in the learning process can enhance students' overall motivation. Teachers may provide recognition and opportunities for active participation in classroom decision-making in addition to material rewards or grades, as suggested by Hanaris (2023). This approach is designed to enhance students' intrinsic motivation and, consequently, their motivation driven by external incentives.

The term learning motivation can be distinguished into two categories, namely intrinsic motivation and extrinsic motivation (Uno, 2023). The results of this study suggest that intrinsic motivation, defined as the desire for success and internal drive, maybe a more dominant factor in this study, given the high prevalence of related indicators. Intrinsic motivation is typically more robust and enduring, driven by internal satisfaction, such as the fulfilment of a goal, the desire to gain knowledge, or the pleasure derived from the learning process itself. In contrast, extrinsic motivation, as measured by the reward indicator in learning, yielded lower results, indicating that external rewards less influenced students. This may reflect that students in Class VI of Mangkang Kulon 02 State Elementary School in Semarang were more motivated by

internal factors and long-term goals than by direct rewards.

Prior research has also indicated that a conducive learning environment and engaging learning activities significantly influence students' motivation to learn (Wafiqni et al., 2023; Zajda, 2018). Therefore, teachers must consistently cultivate a conducive learning environment and implement engaging learning strategies to maintain and foster students' motivation (Chuang, 2014; Vibulphol, 2016). In order to enhance students' motivation to learn, teachers must integrate intrinsic motivation through the provision of responsibility and autonomy in learning, as well as recognition of individual student effort. Furthermore, creating a conducive learning environment and implementing engaging learning strategies can reinforce students' long-term motivation.

CONCLUSION

In light of the research findings and subsequent discourse, it can be posited that: (1) The level of creative thinking skills exhibited by students in grade 6 at SD Negeri Mangkang Kulon 02 Semarang remains relatively low. One of the factors contributing to the students' limited creative thinking skills in electrical materials is their tendency to engage in detailed thinking. (2) The level of student learning motivation is moderate, as evidenced by the student's capacity to master science materials. This category of extrinsic motivation is contingent upon the teacher's attitude towards the class. Therefore, it is essential for teachers to consistently provide students with clear and meaningful goals to stimulate their motivation.

REFERENCES

- Aktas, M. C. (2016). Turkish high school teachers' conceptions of creativity in mathematics. *Journal of Education and Training Studies*, 4(2), 42–52.
- Al-Dulaimi, Z. Y. S. (2016). Education, educational services and their quality. *Journal of Marketing Management*, 4(1), 58–66.
- Ambrose, D., & Sternberg, R. J. (2016). *Creative intelligence in the 21st century grappling with enormous problems and huge opportunities*. Rotterdam : Sense Publisher.
- Ardiansyah, A. S., & Sunaringtyas, A. D. (2016). Identifikasi proses berpikir kreatif siswa dalam menyelesaikan masalah tipe multiple solution task. *Prisma, Prosiding Seminar Nasional Matematika*, 268–279.
- Azis, N. A. (2018). Profil keterampilan berpikir kreatif siswa dalam memecahkan masalah matematika ditinjau dari kepribadian. *Matematika Dan Pembelajaran*, 6(2), 143–157.
- Azzahra, I., Nurhasanah, A., & Hermawati, E. (2023). Implementasi kurikulum merdeka pada pembelajaran ipas di sdn 4 purwawinangun. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, 9(2), 6230–6238.
- Budiyono, B., Islam, H. S., & Siswanto, S. (2022). Open ended problems: Students' creative thinking process on fluency indicators in terms of self-efficacy. *AIP Conference Proceedings*, 2566(1).
- Chuang, Y.-T. (2014). Increasing learning motivation and student engagement through the technology-supported learning environment. *Creative Education*, 5(23), 1969.
- Cigan, V. (2014). Relationship between students' motivation and their socio-demographic characteristics. *Linguistica*, 54(1), 11–30.
- Erduran, S. (2023). Social and institutional dimensions of science: The forgotten components of the science curriculum? In *Science* (Vol. 381, Issue 6659, p. eadk1509). American Association for the Advancement of Science.
- Fakhirah, N. L., Darmiany, D., & Astria,

- F. P. (2023). Analisis kemampuan berpikir kreatif siswa pada mata pelajaran ipa kelas iv di sdn 36 cakanegara. *Jurnal Ilmiah Profesi Pendidikan*, 8(1b), 719–733.
- Good, H. (2024). Unlocking creativity in education: Daydream believers. *Childhood Education*, 100(2), 20–27.
- Hanaris, F. (2023). Peran guru dalam meningkatkan motivasi belajar siswa: Strategi dan pendekatan yang efektif. *Jurnal Kajian Pendidikan Dan Psikologi*, 1(1 Agustus), 1–11.
- Henriksen, D. (2017). Creating STEAM with design thinking: Beyond STEM and arts integration. *The STEAM Journal*, 3(1), 11.
- Kau, M. A. (2017). Peran guru dalam mengembangkan kreativitas anak sekolah dasar. *Proceeding Seminar Dan Lokakarya Nasional Bimbingan Dan Konseling*, 1(0), 157–166.
- Kurnia, A. (2021). Profil kemampuan berpikir kreatif siswa menggunakan soal tes pilihan ganda pada pembelajaran Ilmu Pengetahuan Alam. *Indonesian Journal of Educational Science (IJES)*, 4(1), 27–32.
- Kuška, M., Trnka, R., Mana, J., & Nikolai, T. (2020). Emotional creativity: A meta-analysis and integrative review. *Creativity Research Journal*, 32(2), 151–160.
- Liem, G. A. D., & Chua, C. S. (2021). Motivation in talent development of high-ability students: Research trends, practical implications, and future directions. In *the Social and Emotional Development of Gifted Children* (pp. 173–189). Routledge.
- Mahfud, M. (2017). Berpikir dalam belajar; membentuk karakter kreatif peserta didik. *Al-Tarbawi Al-Haditsah: Jurnal Pendidikan Islam*, 1(1).
- McGarry, B. J., Theobald, K., Lewis, P. A., & Coyer, F. (2015). Flexible learning design in curriculum delivery promotes student engagement and develops metacognitive learners: An integrated review. *Nurse Education Today*, 35(9), 966–973.
- Munandar, U. (2016). *Pengembangan kreativitas anak berbakat*. Jakarta: Rineka cipta.
- MZ, A. F. S. A., Widiyanti, W., & Huda, M. M. (2024). Analisis keterampilan berpikir kreatif siswa pada mata pelajaran ipas kelas v sekolah dasar. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 9(1), 992–1001.
- Ni'mah, A. (2022). Upaya guru dalam meningkatkan kreativitas berpikir peserta didik di sekolah dasar. *Jurnal Penelitian Dan Pengembangan Pendidikan*, 6(2), 173–179.
- Nugroho, G. (2020). Analisis Motivasi Belajar Siswa Pada Pembelajaran IPA di SDN16/II Sepunggur. *Integrated Science Education Journal*, 1(2), 65–69.
- Parke, M. R., Seo, M.-G., & Sherf, E. N. (2015). Regulating and facilitating: the role of emotional intelligence in maintaining and using positive affect for creativity. *Journal of Applied Psychology*, 100(3), 917.
- Prayogi, A. G., Amry, Z., Matematika, P., & Medan, U. N. (2021). Pengaruh kemampuan berpikir kreatif dan kecerdasan emosional terhadap kemampuan pemecahan masalah matematik siswa di kelas viii mts al-jamiyatul washliyah tembung. *Jurnal Fibonacci*, 2(1), 38–41.
- Priantini, D. A. M. M. O., Suarni, N. K., & Adnyana, I. K. S. (2022). Analisis kurikulum merdeka dan platform merdeka belajar untuk mewujudkan pendidikan yang berkualitas. *Jurnal Penjaminan Mutu*, 8(02), 238–244.
- Putri, I. W. S., Hussen, S., & Adawiyah, R. (2017). Kemampuan berpikir kreatif dalam menyelesaikan masalah kesebangunan di smpn 11 jember. *Jurnal Edukasi*, 4(3), 59–62.
- Rubenstein, L. D., Callan, G. L., Neumeister, K. S., Ridgley, L. M., & Finch, M. H. (2020). How problem

- identification strategies influence creativity outcomes. *Contemporary Educational Psychology*, 60, 101840.
- Ryan, R. M., & Deci, E. L. (2018). *Self-determination theory basic psychological needs in motivation, development, and wellness*. New York : Guilford Publications.
- Santoso, B. P., & Wulandari, F. E. (2020). Pengaruh pembelajaran berbasis proyek dipadu dengan metode pemecahan masalah pada keterampilan berpikir kreatif siswa dalam pembelajaran IPA. *Journal of Banua Science Education*, 1(1), 1–6.
- Saregar, A., Cahyanti, U. N., Misbah, M., Susilowati, N. E., Anugrah, A., & Muhammad, N. (2021). CORE learning model: Its effectiveness towards students' creative thinking. *International Journal of Evaluation and Research in Education*, 10(1), 35-41.
- Sari, R. S., & Suhaili, N. Y. (2020). Bakat terhadap motivasi belajar siswa dalam proses belajar dan pembelajaran. *Ensiklopedia of Journal*, 3(1), 140–147.
- Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational Psychology*, 60, 101832.
- Supriyono. (2023). *Pengembangan pembelajaran ipa konsep listrik dinamis berbasis weblog berorientasi steam untuk meningkatkan kreativitas dan hasil belajar peserta didik* [Tesis. Semarang : Program Magister Pendidikan IPA Universitas PGRI Semarang].
<https://library.upgris.ac.id/digital/search?keyword=STEAM&kdasar=judul&kjenis=&kjurusan=54&korder=kdesc>
- Suyidno, S., Susilowati, E., Arifuddin, M., Misbah, M., Sunarti, T., & Dwikoranto, D. (2019). Increasing students responsibility and scientific creativity through creative responsibility based learning. *Jurnal Penelitian Fisika Dan Aplikasinya (JPFA)*, 9(2), 178-188.
- Syamsurijal, S. (2023). Titik temu pendidikan dan pembangunan sumber daya manusia berdaya saing. *Edu Cendikia: Jurnal Ilmiah Kependidikan*, 3(03), 545–553.
- Tapinos, E. (2016). The limitations impacting teachers' understanding of creative thinking. *Creative Education*, 7(10), 1404–1409.
- Tarsini, T., & Ningsih, T. (2021). Integrasi pembelajaran ips dan ipa kelas iv di madrasah ibtidaiyah pembina pengamalan agama (mi p2a) meri kutasari purbalingga. *Jurnal Ilmiah Mandala Education*, 7(3).
- Umam, H. I., & Jiddiyah, S. H. (2021). Pengaruh pembelajaran berbasis proyek terhadap keterampilan berpikir kreatif ilmiah sebagai salah satu keterampilan abad 21. *Jurnal Basicedu*, 5(1), 350–356.
- Uno, H. B. (2023). *Teori motivasi dan pengukurannya analisis di bidang pendidikan*. PT. Bumi Aksara.
- Vibulphol, J. (2016). Students' motivation and learning and teachers' motivational strategies in english classrooms in thailand. *English Language Teaching*, 9(4), 64–75.
- Wafiqni, N., Amalia, S., & Sarifah, I. (2023). Hubungan lingkungan belajar dengan motivasi belajar siswa sekolah dasar. *Ibtida'i: Jurnal Kependidikan Dasar*, 10(1), 69–82.
- Wahyuni, A., & Kurniawan, P. (2018). Hubungan kemampuan berpikir kreatif terhadap hasil belajar mahasiswa. *Matematika: Jurnal Teori Dan Terapan Matematika*, 17(2).
- Wicaksono, A. B., Khabibah, S., & Masriyah, M. (2022). Konsepsi guru matematika sma tentang berpikir kreatif. *Edumatica: Jurnal Pendidikan Matematika*, 12(03), 249–255.
- Yenti, Y., & Suaedi, S. (2022). Pengaruh kemampuan pemecahan masalah dan kecerdasan emosional terhadap

- kemampuan berpikir kreatif siswa. *Proximal: Jurnal Penelitian Matematika Dan Pendidikan Matematika*, 5(1), 91–97.
- Zajda, J. (2018). Motivation in the classroom: Creating effective learning environments. *Educational Practice and Theory*, 40(2), 85–103.