Bioscientist: Jurnal Ilmiah Biologi
E-ISSN 2654-4571; P-ISSN 2338-5006
Volume 12, Issue 2, December 2024; Page, 1972-1979
Email: bioscientist@undikma.ac.id

CREATIVE THINKING SKILLS AT PUBLIC SENIOR HIGH SCHOOL 1 BELITANG OKU TIMUR REGENCY SOUTH SUMATRA

Tety Kartika Sari[1]*, Mimien Henie Irawati Al Muhdar[2], Sueb[3]
[1,2,3]Study Program Magister Biologi Education, Deparment of Biology, FMIPA, Universitas Negeri Malang, Indonesia
*Email: kartikasaritety@gmail.com
DOI: https://doi.org/10.33394/bioscientist.v12i2.12957
Submit: 27-10-2024; Revised: 22-11-2024; Accepted: 29-11-2024; Published: 30-12-2024

ABSTRACT: This study aims to measure the level of creative thinking skills among tenth-grade students at Public Senior High School 1 Belitang. Creative thinking skill is the ability to think in new, original, and flexible ways. It involves generating innovative ideas, solving problems in unique ways, and making connections between seemingly unrelated concepts. This skill is essential for adapting to new situations and fostering innovation across various disciplines. Creative thinking is one of the essential skills for the 21st century. This research employed a quantitative descriptive method with data collection through questionnaires and interviews. A total of 96 students participated in completing the questionnaires, and interviews were conducted with 3 biology teachers. The results showed that students' average creative thinking skills were in the medium category, with a percentage of 70%. Interviews with teachers revealed that although teaching media such as PowerPoint and student worksheets were used, creative thinking skills were not explicitly taught or assessed. These findings highlight the importance of developing more innovative teaching methods and using technology and multimedia to enhance students' creative thinking skills.
Keywords: creative thinking skills, innovative teaching, technology, multimedia.

How to Cite: Sari, T., Al Muhdhar, M., & Sueb, S. (2024). Creative Thinking Skills at Public Senior High School 1 Belitang Oku Timur Regency South Sumatra. *Bioscientist: Jurnal Ilmiah Biologi*, *12*(2), 1972-1979. https://doi.org/10.33394/bioscientist.v12i2.12957

INTRODUCTION

The "Merdeka Curriculum" is a government policy to foster innovative learning processes that accommodate students. This curriculum is expected to address the challenges of 21st-century education, which demands students to achieve the 4C skills: critical thinking, communication, collaboration, and creativity (Indarta et al., 2022). The goals of 21st-century education include: (1) preparing individuals for a dynamic and unpredictable world, (2) fostering creativity, (3) appreciating individual differences, and (4) producing innovators (Astuti et al., 2019). Creative thinking skills are one of the essential foundation skills of the 21st century (Miller et al., 2023).

Creative thinking skills refer to an individual's ability to develop new ideas, find new ways of working, and adopt new perspectives on various aspects of life and their surroundings (Siahaan et al., 2020). These skills are critical for children in preparing themselves for rapid and increasingly complex changes in the world (Gu et al., 2019). In the digital era, creative thinking skills have become even more important (Ramdani & Artayasa, 2020). Creative thinking is closely related to other

Bioscientist: Jurnal Ilmiah Biologi
E-ISSN 2654-4571; P-ISSN 2338-5006
Volume 12, Issue 2, December 2024; Page, 1972-1979
Email: bioscientist@undikma.ac.id

essential skills, such as critical thinking, indicating that fostering creativity can simultaneously enhance other competencies (Park et al., 2021).

Innovative learning, such as using engaging media, can improve creative thinking skills (Ghernaout et al., 2018). According to Gu et al. (2019), creative thinking skills can be developed through five stages: inclusion, ideation, interaction, identification, and inspiration. Teaching methods that promote creative thinking can enhance students' learning outcomes in multimedia materials development courses, encouraging them to think beyond limitations, present different ideas and answers, and continuously innovate, resulting in more creative and meaningful outputs (Li et al., 2022).

Empowering students' creative thinking skills can be achieved by giving them opportunities to think freely, without being constrained by existing rules or norms, encouraging divergent and convergent thinking, and promoting critical, analytical, and reflective thinking in every learning activity (Putri & Alberida, 2022). Creative thinking skills can significantly positively influence, such as generating new ideas and using ideas differently, which can be applied to conservation or solving environmental problems (Sueb et al., 2024). According to Karunarathne & Calma (2024), creative thinking skills improve through teacher feedback, self-reflection, and task revision. Additionally, training in self-confidence and risk-taking enhances creative thinking (Perry & Karpova, 2017) Creative thinking skills are essential to be empowered in biology learning because they can help students integrate various biological concepts to generate new ideas for biological problems in everyday life (Ramdani et al., 2024).

Every student possesses different levels of creative thinking skills. Gu et al., (2019) study used three creativity tasks to assess students' creative thinking skills: alternative uses tasks, drawing tasks, and guessing tasks. Creative thinking skills can also be measured using a questionnaire with five-point Likert scale statements, ranging from strongly agree to strongly disagree (Siregar, 2020). According to Goch (2018), students' creative thinking skills develop over time, making it essential to assess these skills periodically. Such assessments benefit both students and teachers, guiding for improving and evaluating the learning process. Furthermore, this study aims to assess the level of creative thinking skills among students at Senior High School 1 Belitang, who are situated in a rural environment. This context offers a unique potential for students to leverage their natural surroundings as learning resources. Through this assessment, the study seeks to gather empirical data that can serve as a basis for developing targeted educational programs or instructional media designed to enhance creative thinking skills, thereby equipping students with the competencies needed to navigate future challenges effectively.

METHOD

This study used a quantitative descriptive method. Data were collected through questionnaires and interviews in September at Public Senior High School 1 Belitang. The research population comprised all students at Public Senior High School 1 Belitang for the 2023/2024 academic year. The sample was selected using cluster sampling, with three classes from the tenth grade chosen as samples from a

Bioscientist: Jurnal Ilmiah Biologi
E-ISSN 2654-4571; P-ISSN 2338-5006
Volume 12, Issue 2, December 2024; Page, 1972-1979
Email: bioscientist@undikma.ac.id

total of 11 class groups. The instrument used in this study was developed by Greenstein, (2012), covering 8 indicators of creative thinking skills: curiosity, fluency, originality, elaboration, flexibility, uniqueness, risk-taking, and collaboration. The instrument was validated by experts and tested for reliability, receiving a score of 94 from experts and a reliability value of 0.83, indicating that the instrument was valid and reliable. A total of 96 tenth-grade students from Public Senior High School 1 Belitang completed the questionnaire. Interviews were conducted with 3 biology teachers at the school. Data obtained from the student questionnaires and teacher interviews were then analyzed descriptively using percentages, categorized as shown in the table below.

Table 1. Criteria for Creative Thinking Skill Assessment

Interval (%)	Category
≥ 86%	Very High
76% - 85%	High
66% - 75%	Medium
56% - 65%	Low
≤ 55%	Very Low

RESULTS AND DISCUSSION

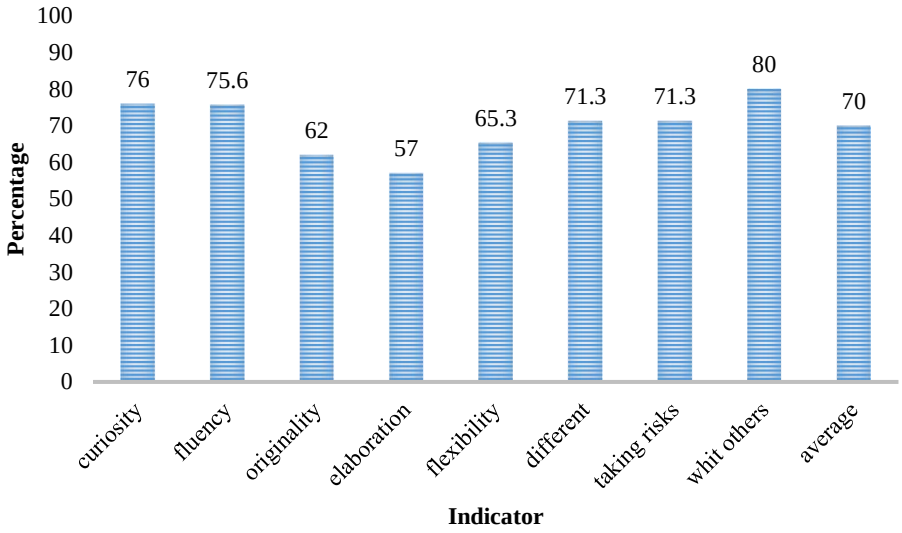
The questionnaire responses from 96 students at Public Senior High School 1 Belitang indicated that students' creative thinking skills were at an average of 70%, placing them in the medium category. The research findings are presented in the following Table.

Table 2. Creative Thinking Skills Assessment Results at Public Senior High School 1 Belitang

Indicator	Percentage
Curiosity	76%
Fluency	75,6%
Originality	62%
Elaboration	57%
Flexibility	65,3%
Different	71,3%
Taking risks	71,3%
With others	80%
Average	**70%**

None of the indicators fell into the very high category. The indicators classified as high were curiosity with a score percentage of 76%, and with others with a score percentage of 80%. Meanwhile, three indicators fell into the medium category: fluency at 75.6%, different at 71.3%, and risk-taking at 71.3%. Indicators in the low category were originality at 62%, elaboration at 57%, and flexibility at 65.3%.

Bioscientist: Jurnal Ilmiah Biologi
E-ISSN 2654-4571; P-ISSN 2338-5006
Volume 12, Issue 2, December 2024; Page, 1972-1979
Email: bioscientist@undikma.ac.id



Graph 1: Percentage of Creative Thinking Skills Assessment Results

Three indicators in the low category warrant attention in efforts to improve creative thinking skills. The originality indicator, with 62%, falls into the low category, indicating that students are less able to generate new ideas and products on some topics. Originality is a key aspect of the creative process, and its presence is essential for effective creativity education (Corazza, 2016). According to Acar et al., (2017), originality has the strongest correlation with creativity and innovation. Traditional teaching methods often do not provide enough space to develop students' creativity and originality. An education system that focuses more on memorization and repetition tends to hinder the development of creative thinking skills (Tabieh & Hamzeh, 2022; Taylor et al., 2020). Habibi et al., (2020) found that using PhET simulations positively impacts the originality aspect of students' creative thinking skills.

The lowest indicator, elaboration, scored 57%, indicating that students struggle to add details to enhance or improve something. Elaboration has a positive relationship with learning comprehension (Howe et al., 2019). Training students to elaborate on questions within a topic and summarize is a skill that should be nurtured. Incorporating digital strategies as a permanent routine and integrating technology and pedagogy can improve students' elaboration skills (Aravena, et al., 2020).

The flexibility indicator scored 65.3%, also classified as medium, indicating that students have difficulty adapting to new situations and are less able to perceive possibilities in learning and daily life. Flexible learning approaches, such as online, blended, and competency-based learning, can enhance student access and succes(Andrade & Alden-Rivers, 2019). Flexible learning and student-centered teaching methods can increase interaction, collaboration, and learning outcomes in secondary schools (Kariippanon et al., 2020). Based on these data, it is evident that students' creative thinking skills need improvement.

Interviews with three biology teachers at Public Senior High School 1 Belitang revealed that teachers rely on textbooks and the Internet as learning

Bioscientist: Jurnal Ilmiah Biologi
E-ISSN 2654-4571; P-ISSN 2338-5006
Volume 12, Issue 2, December 2024; Page, 1972-1979
Email: bioscientist@undikma.ac.id

resources. They also use teaching media, such as PowerPoint presentations and student worksheets. However, teachers have not explicitly assessed or trained students in creative thinking skills, nor are they familiar with the indicators of creative thinking skills. The questionnaire results also revealed that 73% of students use only school-provided textbooks as their main learning resource.

The suboptimal creative thinking skills among students may be attributed to several factors, including teaching methods and learning media. Technology-based communication media have shown better performance in terms of fluency, flexibility, and originality in creative thinking compared to face-to-face communication (Chao et al., 2020). In addition, 99% of students expressed that the use of electronic media facilitates the learning process. Effective teaching methods involving student-centered activities, real-life applications, open-ended questions, and the integration of technology and multimedia can enhance creative thinking skills (Horng et al., 2005).

In this era of modernization, with rapid changes and increasing competition, creative thinking skills have become essential across various fields. Creative thinking skills can boost confidence, solve problems more efficiently, create art, become innovators, bring about change, and achieve greater success in the workplace (Gafour & Gafour, 2020). These skills are crucial resources for becoming innovative and competitive in the face of globalization. In daily life, creative thinking often plays a role in solving problems and addressing challenges, as well as in mental health and well-being (Ritter et al., 2020). In schools, students need creative thinking skills to learn and integrate new knowledge. Overall, creative thinking skills are essential for developing one's capacity to be ready for learning, working, and living life.

CONCLUSION

This study shows that the creative thinking skills of students at Public Senior High School 1 Belitang are in the medium category and still require further development. The indicators of originality, flexibility, and elaboration were in the low category, indicating that students are less capable of generating new ideas and products. Innovative teaching methods, including the use of technology and multimedia, have not been fully utilized by teachers to develop students' creative thinking skills. Therefore, further efforts are needed to strengthen student-centered teaching methods, relate learning to real-life situations, and integrate technology to enhance creative thinking skills. Improving these skills is crucial in preparing students to face 21st-century challenges and rapid changes.

RECOMMENDATION

To improve students' creative thinking skills, teachers should integrate more innovative and student-centered learning methods, such as inquiry and project-based learning, and the use of digital tools that encourage creativity. Teacher training programs focusing on how to teach and assess creativity are crucial, as many educators are not yet familiar with the specific indicators of creative thinking. Additionally, encouraging students to explore beyond textbooks and incorporating real-world applications of learning can further foster originality, flexibility, and

elaboration. Future studies could explore longitudinal approaches to track the long-term effects of these interventions on creativity.

ACKNOWLEDGMENTS

We sincerely thank our supervisors for their invaluable guidance and support throughout this research. We are also immensely thankful to the teachers and students of Public Senior High School 1 Belitang for their willingness to participate as respondents in this study. Additionally, we extend our appreciation to all those who have contributed to and assisted in completing this research.

REFERENCES

Acar, S., Burnett, C., & Cabra, J. F. (2017). Ingredients of Creativity: Originality and More. *Creativity Research Journal*, *29*, 133–144. https://doi.org/10.1080/10400419.2017.1302776

Andrade, M. S. & Alden-Rivers, B. (2019). Developing a Framework for Sustainable Growth of Flexible Learning Opportunities. *Higher Education Pedagogies*, *4*, 1–16. https://doi.org/10.1080/23752696.2018.1564879

Astuti, A. P., Aziz, A., Sumarti, S. S., & Bharati, D. A. L. (2019). Preparing 21st Century Teachers: Implementation of 4C Character's Pre-Service Teacher through Teaching Practice. *Journal of Physics: Conference Series*, *1233*(1), 012109. https://doi.org/10.1088/1742-6596/1233/1/012109

Chao, S. H., Jiang, J., Hsu, C., Chiang, Y., Ng, E, & Fang, W. (2020). Technology-Enhanced Learning for Graduate Students: Exploring the Correlation of Media Richness and Creativity of Computer-Mediated Communication and Face-to-Face Communication. *Applied Sciences*, *10*, 1602. https://doi.org/10.3390/app10051602

Corazza, G. E. (2016). Potential Originality and Effectiveness: The Dynamic Definition of Creativity. *Creativity Research Journal*, *28*, 258–267. https://doi.org/10.1080/10400419.2016.1195627

Gaete, A. M., Campos-Soto, M., & Rodríguez-Jiménez, C. (2020). Learning Strategies at a Higher Taxonomic Level in Primary Education Students in the Digital Age. *Sustainability*. https://doi.org/10.3390/su12239877

Gafour, O. W., & Gafour, W. S. (2020). Creative Thinking skills – A Review article. *Journal of Education and E-Learning*, *29*(4), 352–358.

Ghernaout, D., Touahmia, M., Aichouni, M., Alghamdi, A., & Messaoudene, N. A. (2018). Fostering Students' Creativity Through Innovative Learning Tools. *Herpetologica*, *3*, 9. https://doi.org/10.11648/J.HER.20180301.13

Greenstein, L. (2012). *Assessing 21st Century Skills: A Guide to Evaluating Mastery and Authentic Learning*. Corwin Press.

Gu, X., Dijksterhuis, A., & Ritter, S. M. (2019). Fostering Children's Creative Thinking Skills with The 5-I Training Program. *Thinking Skills and Creativity*, *32*, 92–101. https://doi.org/10.1016/j.tsc.2019.05.002

Habibi, H., Jumadi, J., & Mundilarto, M. (2020). Phet Simulation as Means to Trigger the Creative Thinking Skills of Physics Concepts. *International Journal of Emerging Technologies in Learning (iJET)*, *15*(06), 166. https://doi.org/10.3991/ijet.v15i06.11319

Horng, J. S., Hong, J. C., ChanLin, L. J., Chang, S. H, & Chu, H. (2005). Creative Teachers and Creative Teaching Strategies. *International Journal of Consumer Studies*, *29*, 352–358. https://doi.org/10.1111/J.1470-6431.2005.00445.X

Howe, C., Hennessy, S., Mercer, N., Vrikki, M., & Wheatley, L. (2019). Teacher–Student Dialogue During Classroom Teaching: Does It Really Impact on Student Outcomes? *Journal of the Learning Sciences*, *28*, 462–512. https://doi.org/10.1080/10508406.2019.1573730

Indarta, Y., Jalinus, N., Waskito, W., Samala, A. D., Riyanda, A. R., & Adi, N. H. (2022). Relevansi Kurikulum Merdeka Belajar dengan Model Pembelajaran Abad 21 dalam Perkembangan Era Society 5.0. *Edukatif: Jurnal Ilmu Pendidikan*, *4*(2), 3011–3024. https://doi.org/10.31004/edukatif.v4i2.2589

Kariippanon, K. E., Cliff, D, Ellis, Y. G, Ucci, M, Okely, A, & Parrish, A. (2020). School Flexible Learning Spaces, Student Movement Behavior and Educational Outcomes among Adolescents: A Mixed-Methods Systematic Review. *The Journal of School Health*. https://doi.org/10.1111/josh.12984

Karunarathne, W., & Calma, A. (2024). Assessing Creative Thinking Skills in Higher Education: Deficits and Improvements. *Studies in Higher Education*, *49*(1), 157–177. https://doi.org/10.1080/03075079.2023.2225532

Li, X.-Z., Chen, C.-C., & Kang, X. (2022). Research on The Cultivation of Sustainable Development Ability of Higher Vocational Students by Creative Thinking Teaching Method. *Frontiers in Psychology*, *13*, 979913. https://doi.org/10.3389/fpsyg.2022.979913

Park, J. H., Niu, W., Cheng, L, & Allen, H. (2021). Fostering Creativity and Critical Thinking in College: A Cross-Cultural Investigation. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.760351

Perry, A., & Karpova, E. (2017). Efficacy of Teaching Creative Thinking Skills: A Comparison of Multiple Creativity Assessments. *Thinking Skills and Creativity*, *24*, 118–126. https://doi.org/10.1016/j.tsc.2017.02.017

Putri, Y. S., & Alberida, H. (2022). Keterampilan Berpikir Kreatif Peserta Didik Kelas X Tahun Ajaran 2021/2022 di SMAN 1 Pariaman: (Creative Thinking Skills Class X Students for the 2021/2022 Academic Year at SMAN 1 Pariaman). *BIODIK*, *8*(2), 112–117. https://doi.org/10.22437/bio.v8i2.17356

Ramdani, A., & Artayasa, I. P. (2020). Keterampilan Berpikir Kreatif Mahasiswa dalam Pembelajaran IPA Menggunakan Model Inkuiri Terbuka. *Jurnal Pendidikan Sains Indonesia*, *8*(1), 1–9. https://doi.org/10.24815/jpsi.v8i1.15394

Ramdani, D., Susilo, H., Suhadi, S., Sueb, S., & Fadzil, H. Mohd. (2024). *Critical Thinking, Creative Thinking, and Metacognitive Ability: Preliminary Investigation of Biology Teacher Candidates at Siliwangi University*. 030007. https://doi.org/10.1063/5.0214955

Ritter, S. M., Gu, X., Crijns, M., & Biekens, P. (2020). Fostering Students' Creative Thinking Skills by Means of a One-Year Creativity Training Program. *PLOS ONE*, *15*(3), e0229773. https://doi.org/10.1371/journal.pone.0229773

Siahaan, K. W. A., Lumbangaol, S. T. P., Marbun, J., Nainggolan, A. D., Ritonga, J. M., & Barus, D. P. (2020). Pengaruh Model Pembelajaran Inkuiri

Terbimbing dengan Multi Representasi terhadap Keterampilan Proses Sains dan Penguasaan Konsep IPA. *Jurnal Basicedu*, *5*(1), 195–205. https://doi.org/10.31004/basicedu.v5i1.614

Siregar, H. (2020). Kreativitas Siswa dalam Mata Pelajaran IPA. *Journal Evaluation in Education (JEE)*, *1*(1), 21–26. https://doi.org/10.37251/jee.v1i1.27

Sueb, S., Muhdhar, M. H. I. A., Wardhani, Y. S., Abdillah, R. R., Wulandari, I. A. I., Astuti, L., Suhadi, S., & Achmad, R. (2024). *The effectiveness of adiwiyata electronic module based on reading mind mapping CIRC to improve students' creative thinking skills, adaptability skills, and environmental literacy*. 070024. https://doi.org/10.1063/5.0215342

Tabieh, A. A. & Hamzeh, M. (2022). The Impact of Blended-Flipped Learning on Mathematical Creative Thinking Skills. *Journal of Educators Online*. https://doi.org/10.9743/jeo.2022.19.3.15

Taylor, C. L., Zaghi, A., Kaufman, J., Reis, S, & Renzulli, J. S. (2020). Divergent Thinking and Academic Performance of Students with Attention Deficit Hyperactivity Disorder Characteristics in Engineering. *Journal of Engineering Education*, *109*, 213–229. https://doi.org/10.1002/jee.20310

Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J. M., Morisseau, T., & Lubart, T. (2023). Creativity, Critical Thinking, Communication, and Collaboration: Assessment, Certification, and Promotion of 21st Century Skills for the Future of Work and Education. *Journal of Intelligence*, *11*. https://doi.org/10.3390/jintelligence11030054

Van-Goch, M. (2018). Creativity in Liberal Education Before and After Study Commencement. *Headache*, 1475–1483. https://doi.org/10.4995/head18.2018.8228