



# The Effect of Emotional Intelligence and Independent Learning on Students' Creative Thinking Ability

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**Abstract:** This study aims to analyze the level of emotional intelligence and learning. The research variables consist of independent variables, namely emotional intelligence and learning independence, while the dependent variable is the ability to think creatively. The instrument for measuring the independent variables is an emotional intelligence questionnaire consisting of 20 question items developed from 5 indicators, namely recognizing emotions, managing emotions, motivating oneself, recognizing other people's feelings, and building relationships; the self-learning questionnaire consists of 20 question items developed from 5 indicators namely initiative, self-confidence, motivation, discipline, and responsibility; while the dependent variable is measured by a test of 4 questions created from four aspects, namely fluency, flexibility, originality, and elaboration. The questionnaire and test fulfill the validity and reliability tests. The data were processed by descriptive and inferential analysis through multiple regression analysis with the SPSS version 23 program. The study's results concluded that emotional intelligence and independent learning simultaneously affect students' creative thinking ability, with an effect is 59.7%. Partially the influence of emotional intelligence on the results of the ability to think creatively is 36.3%, and the impact of independent learning on the ability to think creatively is 9.5%. It means that the higher the emotional intelligence and learning independence students possess; their learning outcomes increase. Thus, to improve students' creative thinking abilities, emotional intelligence and learning independence must be improved first.

**Keywords:** Ability to think creatively; Emotional intelligence; Independent learning

## Introduction

In preparing ourselves to face the intelligent society 5.0, the three highest abilities are the ability to solve complex problems, critical thinking, and creativity (Utami, 2020). Likewise et al. stated that the skills that someone in the 21st century must possess are: Learning and innovation skills, including communication, collaboration, critical thinking, and creativity (Zubaidah, 2018; Arnyana, 2019).

These 21st-century skills can be achieved through learning mathematics (Runisah, 2021; Satriani, 2022). The National Council of Teachers of Mathematics (NCTM) has also set standards for mathematical abilities obtained from learning mathematics, such as problem-solving skills, reasoning and proof, communication, connection, representation, innovation, and creativity

(Hodiyanto, 2017). The ability to think creatively, one of the needs of the world of work in the future, is also categorized as high-order thinking skills or High Order Thinking (HOT) (Faturohman & Afriansyah, 2020). Creativity is the ability to provide new ideas, creativity as a process reflects proficiency in thinking which includes: proficiency, flexibility, originality, and elaboration (Sumarmo et al., 2012). The ability to think creatively emphasizes the aspects of fluency, flexibility, originality, and detail. At the same time, creative thinking includes identifying problems, understanding problems, making assumptions and formulating hypotheses, testing hypotheses, and evaluating and communicating ideas. The ability to think creatively is essential for students because it can direct students in solving various problems with the proper method, starting from how to identify problems to

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communicating the results of their thoughts (Fardah, 2012).

Several studies related to creative thinking skills include (Marliani, 2015) explaining that mathematical thinking helps practice mathematical divergent thinking skills; application of the PBL (teaching and learning process) learning model to train and improve students' mathematical creative thinking skills (Abdulrozzak, 2016); creative thinking and problem-solving through the application of project-based learning models (Rahmazatullaili et al., 2017); increasing students' creative thinking skills through a realistic mathematical approach (Siregar et al., 2020); gender and resilience factors in achieving creative thinking abilities (Dilla et al., 2018); development of learning tools to improve thinking skills (Syahrir, 2019; Cahyono, 2017; Yusro, 2017; Arvianto & Ardhana, 2020).

However, from these previous studies, it still needs to be more frequent to find research on the effect of emotional intelligence and independent learning on creative thinking skills. Even though based on the theory of emotional intelligence, the perspective is that emotions can be used to facilitate thinking processes and are found to influence creative thinking skills (Sk & Halder, 2020), this is supported by evidence from empirical research results in several countries such as research results (Afshar & Rahimi, 2014) in Iran found that there is a positive reciprocal relationship between emotional intelligence and research results (Kang, 2015) in Malaysia found that creative thinking skills and emotional intelligence had a significant effect on thinking ability. However, similar research in the last five years in Indonesia found only one research conducted (Dianti, 2018), finding that emotional intelligence affects students' creative thinking abilities at 12.9%, so existing research needs to be developed and further investigated. Research related to the effect of emotional intelligence and independent learning on the ability to think creatively is essential to provide a prototype of the effect of emotional intelligence and independent learning on the ability to think creatively. In addition, research findings can be used as a reference in developing students' creative thinking skills. Thus, the primary purpose of this research is to analyze and describe the effect of emotional intelligence and independent learning on students' creative thinking abilities.

## Method

This research was a quantitative survey with a cross-sectional approach considering that the researcher observes and measures variables only in a specific time span. This research was conducted in January-March

2022 involving 320 students from a junior high school (SMP) in Maros Regency spreaded over ten classes. A sample of 75 people was obtained through a simple random sampling technique.

The research procedure was carried out in four stages, namely: Preparation: by conducting an inductive study of the problem, studying relevant literature and sources and making a research plan, compiling and validating instruments; Implementation: giving questionnaires and tests, as well as collecting relevant data; Data analysis: Data reduction and analysis through descriptive and inferential analysis with multiple regression analysis; Concluding: analysis and evaluation to get an accurate picture in drawing the correct conclusions.

The research variables consisted of independent variables: emotional intelligence and learning independence. In comparison, the dependent variable was the ability to think creatively. The instrument for measuring the independent variables was an emotional intelligence questionnaire consisting of 20 question items developed from 5 indicators, namely recognizing emotions, managing emotions, motivating oneself, recognizing other people's emotions, and building relationships (Goleman et al., 2015); then the learning independence questionnaire consisted of 20 question items developed from 5 indicators namely initiative, self-confidence, motivation, discipline, and responsibility (Pramana & Dewi, 2014); while the dependent variable is measured by a test consisting of 4 questions developed from four indicators, namely four indicators namely fluency, flexibility, originality, and elaboration. The questionnaire and test fulfill the validity and reliability tests.

The research data were processed with descriptive analysis in order to describe the categories of each variable category and variable indicators with reference to table 1 and table 2.

**Table 1.** Classification of Variable Categories of Emotional Intelligence and Learning Independence (Mardapi, 2017)

Interval Score	Categories
$> M + 1 \text{ Std. Dev}$	Very High
$M - (M + 1 \text{ Std. Dev})$	High
$(M - 1 \text{ Std. Dev}) - M$	Low
$< M - 1 \text{ Std. Dev}$	Very Low

**Table 2.** Classification of Creative Thinking Ability Variable Categories (Azwar, 2015)

Interval Score	Categories
$X < M - 1SD$	Low
$M - 1SD \leq X < M + 1SD$	Currently
$M + 1SD \leq X$	Tall

Furthermore, inferential analysis was processed using multiple regression analysis techniques through the SPSS version 23 program which was used as the basis for answering the problem formulation.

### Result and Discussion

The results of this study consist of the results of descriptive analysis and the results of inferential analysis. The results of the descriptive analysis of each variable are presented in table 3.

**Table 3.** The Results of the Independent Variable Descriptive analysis

Statistic	X1 Value	X2 Value
N	75.00	75.00
Mean	53.44	53.27
Median	52.00	53.00
Mode	52.00	49.00
Standard Deviation	7.55	7.90
Sample Variance	57.06	62.47
Range	39.00	44.00
Minimum	34.00	31.00
Maximum	73.00	75.00

Based on Table 3, it is found that the average value of emotional intelligence is 53.44 from the ideal value of 73 indicating that students' emotional intelligence is in the high category. While the average value of learning independence is 53.27 from the ideal value of 75 indicating that learning independence is in the high category. Furthermore, the results of the distribution of student categories on the independent variables are described in table 4.

**Table 4.** Distribution of Independent Variable Categories

Categories	Class Intervals	f.	%	f	%
Very high	> 60.14	11.00	14.67	10.00	13.33
High	52.76 - 60.14	24.00	32.00	27.00	36.00
Low	45.38 - 52.76	29.00	38.67	27.00	36.00
Very low	< 45.38	11.00	14.67	11.00	14.67
Total		75.00	100.00	75.00	100.00

Based on table 4 it is found that the level of students' emotional intelligence was dominated by students with emotional intelligence in the low category, while the level of learning independence was dominated by students with high learning independence and moderate learning independence.

Furthermore, the results of the descriptive analysis for the variable ability to think creatively are described in table 5. Based on Table 5, it shows that the average value of creative thinking skills is 13.83 out of an ideal value of 16. This data shows that students' creative thinking skills are in the high category. Furthermore, the

results of the distribution of student categories are described in table 6.

**Table 5.** The Results of the Independent Variable Descriptive analysis

Statistics	Assess Creative Thinking Ability
N	75.00
Mean	13.83
Median	14.00
Mode	14.00
Standard Deviation	1.73
Sample Variance	3.01
Range	7.00
Minimum	9.00
Maximum	16.00

**Table 6.** Distribution of Dependent Variable Categories

Categories	Class Intervals	f	%
Low	$X < 12$	11.00	14.67
Average	$12 \leq X < 16$	50.00	66.67
High	$X > 16$	14.00	18.67
Total		75.00	100.00

Based on table 6 it is found that the level of students' creative thinking skills is dominated by students with creative thinking abilities in the medium category. Furthermore, the results of inferential analysis using multiple regression analysis are described in table 7.

**Table 7.** Results of Multiple Regression Analysis

Model	Sum of Squares	Df	Mean Square	F	sig
Regression	134.17	2.00	67.08	53.42	0.00b
Residual	90.41	72.00	1.25		
Total	224.58	74.00			

  

Model	B	Std. Error	Beta	T	Sig
Constant	3.83	.097		3.94	0.00
Emotional Intelligence	0.12	0.03	0.51	4.52	0.00
Independent Learning	0.07	0.03	0.31	2.73	0.08

Based on Table 7, it is found that the regression coefficient is 0.118 for the emotional intelligence variable. The calculated t value is 4.52 and the significance value is 0.000. This proves that the t count > t table (4.52 > 1.99) and a significant value of 0.000 is less than the significant level of 0.05 (0.00 < 0.05), so it can be concluded that there is an influence of emotional intelligence on students' creative thinking abilities.

The results of this study mean that the higher the emotional intelligence of students, the higher their ability to think creatively. The results of this study align with the results of research, which explain that emotional intelligence contributes 61.00% to the ability to think creatively (Nuha & Pedhu, 2021). Emotional intelligence is an individual's strength in learning new

knowledge and several aspects of higher-order thinking, such as problem-solving, interpretation, and abstract thinking (Durnali et al., 2023). Emotional intelligence in learning can help individuals understand their own and other people's emotions to control their thoughts and actions (Lewis et al., 2005). In addition, emotional intelligence helps students understand and manage feelings, emotions, and emotional knowledge to increase emotional and intellectual growth (Asrar-ul-Haq et al., 2017).

Students' emotional intelligence as a whole predicts and has a significant effect on the results of students' creative abilities, higher emotional intelligence has higher creativity, and this finding is in line with research results (Noorafshan et al., 2013); When a student's emotional intelligence is high, the student is better at solving problems, more efficient in managing his emotions so that it has a better impact on creativity. This finding is reinforced by research findings that there is a significant positive influence between emotional intelligence with creative thinking abilities and students' academic achievement.

Furthermore, the learning independence variable was also found to affect the ability to think creatively based on the regression coefficient obtained for 0.068 with a  $t$  count  $>$   $t$  table ( $2.726 > 1.995$ ) and a significant value  $<$  from a significant level of 0.05 ( $0.009 < 0.05$ ), so it can be concluded that there is an influence of independent learning on students' creative thinking abilities. The results of this study mean that the higher the student's learning independence, the higher the student's creative thinking ability.

The results of this study are supported by the results of previous research, which found that students with high creative thinking abilities were able to show indicators of flexibility and originality, so it was concluded that the level of student learning independence affected the level of students' mathematical creative thinking ability (Atiyah & Nuraeni, 2022), students with independent learning High students occupy the very creative thinking category where students can fulfill all indicators of creative thinking well (Pratiwi et al., 2021). Likewise with the findings (Akhdiyati & Hidayat, 2018) that the mathematical creative thinking abilities of high school students are positively influenced by mathematics learning independence of 87.50%.

Learning independence is one of the important elements in the learning process. Independence describes a situation where a student desires to compete for his/her good, can make decisions and initiatives to overcome problems faced, is confident in doing assignments, and is responsible for what he is doing (Egok, 2016). Students who have good learning

independence will be able to stand alone without depending on other people, be able to socialize, be able to carry out their activities, be able to make their own decisions, and be able to empathize with others. Learning independence is well-created in students. These students can freely control and regulate their thoughts, feelings, and actions and can overcome feelings of shame and doubt (Ananda, 2019).

The main finding of this study is that emotional intelligence and learning independence simultaneously significantly affect the results of students' creative thinking abilities, with a significant influence 59.70%. While the partial effect of emotional intelligence on the results of students' creative thinking ability 36.30%, and learning independence affected the students' creative thinking ability level by 9.50%. Thus, to improve students' creative thinking abilities, emotional intelligence and learning independence must be improved first.

## Conclusion

This research has analyzed the level of emotional intelligence and learning independence and its effect on students' creative thinking abilities. The study concludes that emotional intelligence and learning independence simultaneously has a significant effect on students' creative thinking abilities, with a significant influence is 59.70%. Furthermore, partially the effect of emotional intelligence on the results of the ability to think creatively is 36.3%, and the effect of independent learning on students' creative thinking ability is 9.5%. It means that the higher the emotional intelligence and learning independence students possess; their learning outcomes will increase. Thus, to improve students' creative thinking abilities, emotional intelligence and learning independence must be improved first.

## Author Contribution

Wahyuddin contributed to the preparation of research concepts and ideas, preparation of theoretical studies, research methods, and preparation of research results. Ifa Umiah contributed to data collection and preparation of research reports. Andi Quraisy contributed to research data processing.

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## Conflicts of Interest

The authors declare that there is no conflict of interest in the publication of this article

## References

- Abdulrozzak, R. (2016). Pengaruh model problem based learning terhadap kemampuan berpikir kreatif siswa. *Jurnal Pena Ilmiah*, 1(1). <https://doi.org/10.23819/pi.v1i1.3580>
- Afshar, H. S., & Rahimi, M. (2014). The relationship among critical thinking, emotional intelligence, and speaking abilities of Iranian EFL learners. *Procedia-Social and Behavioral Sciences*, 136, 75–79. <https://doi.org/10.1016/j.sbspro.2014.05.291>
- Akhdiyati, A. M., & Hidayat, W. (2018). Pengaruh kemandirian belajar matematik siswa terhadap kemampuan berpikir kreatif matematis siswa sma. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, 1(6), 1045–1054. <https://doi.org/10.22460/jpmi.v1i6.p1045-1054>
- Ananda, R. (2019). *Peer Reviewer dan cek similarity The Effect of Learning Strategies and Learning Independence on Learning Outcomes in Learning Evaluation Subject*. Retrieved from <http://repository.uinsu.ac.id/6812/2/The%20effect%20learning.pdf>
- Arnyana, I. B. P. (2019). Pembelajaran untuk meningkatkan kompetensi 4c (communication, collaboration, critical thinking dan creative thinking) untuk menyongsong era abad 21. *Prosiding: Konferensi Nasional Matematika dan IPA Universitas PGRI Banyuwangi*, 1(1), i–xiii. Retrieved from <https://ejournal.unibabwi.ac.id/index.php/knmpa/article/view/829>
- Arvianto, I. R., & Ardhana, Y. M. K. (2020). Pengembangan Perangkat Pembelajaran untuk Meningkatkan Kemampuan Berpikir Kreatif. *Prima: Jurnal Pendidikan Matematika*, 4(1), 22–32. <http://dx.doi.org/10.31000/prima.v4i1.2032>
- Asrar-ul-Haq, M., Anwar, S., & Hassan, M. (2017). Impact of emotional intelligence on teacher's performance in higher education institutions of Pakistan. *Future Business Journal*, 3(2), 87–97. <https://doi.org/10.1016/j.fbj.2017.05.003>
- Atiyah, A., & Nuraeni, R. (2022). Kemampuan berpikir kreatif matematis dan self-confidence ditinjau dari kemandirian belajar siswa. *Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu*, 1(1), 103–112. <https://doi.org/10.31980/powermathedu.v1i1.1920>
- Azwar, S. (2015). *Penyusunan Skala Psikologi Edisi Revisi*. Yogyakarta: Pustaka Pelajar.
- Cahyono, A. E. Y. (2017). Pengembangan Perangkat Pembelajaran Problem-Based Learning Berorientasi pada Kemampuan Berpikir Kreatif dan Inisiatif Siswa. *Pythagoras: Jurnal Pendidikan Matematika*, 12(1), 1–11. <https://doi.org/10.21831/pg.v12i1.14052>
- Dianti, V. A. (2018). *Pengaruh Kecerdasan Emosional Terhadap Kemampuan Berpikir Kreatif Matematis Siswa Dalam Menyelesaikan Soal Open-Ended*. Universitas Pesantren Tinggi Darul'Ulum.
- Dilla, S. C., Hidayat, W., & Rohaeti, E. E. (2018). Faktor gender dan resiliensi dalam pencapaian kemampuan berpikir kreatif matematis siswa SMA. *Journal of Medives: Journal of Mathematics Education IKIP Veteran Semarang*, 2(1), 129–136. <https://doi.org/10.31331/medives.v2i1.553>
- Durnali, M., Orakci, Ş., & Khalili, T. (2023). Fostering creative thinking skills to burst the effect of emotional intelligence on entrepreneurial skills. *Thinking Skills and Creativity*, 47, 101200. <https://doi.org/10.1016/j.tsc.2022.101200>
- Egok, A. S. (2016). Kemampuan Berpikir Kritis Dan Kemandirian Belajar Dengan Hasil Belajar Matematika. *Jurnal Pendidikan Dasar*, 7. Retrieved from <https://core.ac.uk/download/pdf/297684592.pdf>
- Fardah, D. K. (2012). Analisis proses dan kemampuan berpikir kreatif siswa dalam matematika melalui tugas open-ended. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 3(2), 91–99. <https://doi.org/10.15294/kreano.v3i2.2616>
- Faturohman, I., & Afriansyah, E. A. (2020). Peningkatan Kemampuan Berpikir Kreatif Matematis Siswa melalui Creative Problem Solving. *Mosharafa: Jurnal Pendidikan Matematika*, 9(1), 107–118. <https://doi.org/10.31980/mosharafa.v9i1.562>
- Goleman, D., Boyatzis, R. E., McKee, A., & Finkelstein, S. (2015). *HBR's 10 Must Reads on Emotional Intelligence (with featured article "What Makes a Leader?" by Daniel Goleman) (HBR's 10 Must Reads)*. Harvard Business Review Press.
- Hodiyanto, H. (2017). Kemampuan komunikasi matematis dalam pembelajaran matematika. *AdMathEdu*, 7(1), 9–18. Retrieved from <https://www.neliti.com/publications/177556/kemampuan-komunikasi-matematis-dalam-pembelajaran-matematika>
- Kang, F.-L. (2015). Contribution of emotional intelligence towards graduate students' critical thinking disposition. *International Journal of Education and Literacy Studies*, 3(4), 6–17. Retrieved from <https://journals.aiac.org.au/index.php/IJELS/article/view/1908>
- Lewis, N. J., Rees, C. E., Hudson, J. N., & Bleakley, A. (2005). Emotional intelligence medical education: Measuring the unmeasurable? *Advances in Health*

- Sciences Education*, 10, 339-355.  
<https://doi.org/10.1007/s10459-005-4861-0>
- Mardapi, D. (2017). *Pengukuran Penilaian dan Evaluasi Pendidikan Edisi 2*. Yogyakarta: Parama Publishing.
- Marliani, N. (2015). Peningkatan kemampuan berpikir kreatif matematis siswa melalui model pembelajaran Missouri Mathematics Project (MMP). *Formatif: Jurnal Ilmiah Pendidikan MIPA*, 5(1). <http://dx.doi.org/10.30998/formatif.v5i1.166>
- Noorafshan, L., Jowkar, B., & Hosseini, F. S. (2013). Effect of family communication patterns of resilience among Iranian adolescents. *Procedia-Social and Behavioral Sciences*, 84, 900-904.  
<https://doi.org/10.1016/j.sbspro.2013.06.670>
- Nuha, R. A., & Pedhu, Y. (2021). Hubungan Antara Kecerdasan Emosional dan Kemampuan Berpikir Kreatif Mahasiswa Program Studi Bimbingan dan Konseling. *Psiko Edukasi*, 19(2), 128-139. Retrieved from  
<https://ejournal.atmajaya.ac.id/index.php/psiko-edukasi/article/view/3430>
- Pramana, W. D., & Dewi, N. R. (2014). Pengembangan e-book IPA terpadu tema suhu dan pengukuran untuk menumbuhkan kemandirian belajar siswa. *Unnes Science Education Journal*, 3(3). Retrieved from  
<https://journal.unnes.ac.id/sju/index.php/usej/article/view/4267>
- Pratiwi, G. D., Supandi, S., & Harun, L. (2021). Profil Kemampuan Berpikir Kreatif Matematis Siswa Ditinjau Dari Kemandirian Belajar Kategori Tinggi. *Imajiner: Jurnal Matematika dan Pendidikan Matematika*, 3(1), 78-87. Retrieved from  
<https://journal.upgris.ac.id/index.php/imajiner/article/view/7184>
- Rahmazatullaili, R., Zubainur, C. M., & Munzir, S. (2017). Kemampuan berpikir kreatif dan pemecahan masalah siswa melalui penerapan model project based learning. *Beta: Jurnal Tadris Matematika*, 10(2), 166-183. Retrieved from  
<https://jurnalbeta.ac.id/index.php/betaJTM/article/view/104>
- Runisah, R. R. (2021). Pembelajaran Matematika Untuk Menghadapi Era Society 5.0. *Euclid*, 8(2).  
<https://doi.org/10.33603/e.v8i2.4498>.
- Satriani, S. (2022). The Application of Collaborative Learning Model to Improve Student's 4Cs Skills. *Anatolian Journal of Education*, 7(1), 93-102. Retrieved from  
<https://eric.ed.gov/?id=EJ1333566>
- Sk, S., & Halder, S. (2020). Critical thinking disposition of undergraduate students in relation to emotional intelligence: Gender as a moderator. *Heliyon*, 6(11), e05477. Retrieved from  
[https://www.cell.com/heliyon/pdf/S2405-8440\(20\)32320-3.pdf](https://www.cell.com/heliyon/pdf/S2405-8440(20)32320-3.pdf)
- Sumarmo, U., Hidayat, W., Zukarnaen, R., Hamidah, H., & Sariningsih, R. (2012). Kemampuan dan disposisi berpikir logis, kritis, dan kreatif matematik. *Jurnal pengajaran MIPA*, 17(1), 17-33.  
<https://doi.org/10.18269/jpmipa.v17i1.36048>
- Syahrir, S. (2019). Pengembangan Perangkat Pembelajaran Matematika SMP untuk Meningkatkan Kemampuan Berfikir Kreatif. *Jurnal Ilmiah Mandala Education*, 2(1), 436-441.  
<http://dx.doi.org/10.58258/jime.v2i1.195>
- Utami, R. (2020). Integrasi Kurikulum Di Indonesia Dalam Menghadapi Era Society 5.0. *Proceeding IAIN Batusangkar*, 1(3). Retrieved from  
<https://ojs.iainbatusangkar.ac.id/ojs/index.php/proceedings/article/view/2181>
- Yusro, A. C. (2017). Pengembangan perangkat pembelajaran fisika berbasis SETS untuk meningkatkan kemampuan berpikir kreatif siswa. *Jurnal Pendidikan Fisika Dan Keilmuan (JPFK)*, 1(2), 61-66. <http://doi.org/10.25273/jpfk.v1i2.13>
- Zubaidah, S. (2018). Mengenal 4C: Learning and innovation skills untuk menghadapi era revolusi industri 4.0. *2nd Science Education National Conference*, 13(2), 1-18. Retrieved from  
<https://www.researchgate.net/profile/Siti-Zubaidah-7/publication/332469989>