Proceedings Series of Educational Studies

The 5th International Conference on Educational Management and Technology (ICEMT) 2026

Effectiveness Of Engineering Group Guidance Services Problem Solving Using Tetragrow Media to Develop Students Learning Independence

Regina Sandra Resti, Dwi Wulan Septiyani , Widya Multisari*, Evtie Puspasarie, Joko Margono, Dinda Putri Abadi

State University of Malang, Jl. Semarang No. 5 Malang, East Java, Indonesia

*Author of correspondence, Email: widya.multisari.fip@um.ac.id

Abstract

Learning independence is an important aspect in students' personal and career development, but many students are still unable to have awareness and management of their learning process. Low learning independence results in various negative impacts on other aspects of life that do not support the optimization of a student's potential. This study aims to determine the effectiveness of using tetragrow media as an innovation in group guidance services to improve learning independence . This study uses a quantitative approach with a pre-experimental design of one group pretest-posttest design. The research subjects were seven students who were selected randomly. This research instrument adopted a learning independence instrument that has been tested for validity and reliability of 50 statement items. Data analysis using the Wilcoxon Signed Ranks test through the SPSS application showed a Z value = -2.379 and a significance of p = 0.017 (p < 0.05), which means there is a significant difference between the pretest and posttest scores. These results indicate that tetragrow media is effective in improving learning independence. Therefore, the Tetragrow medium is recommended as a supporting tool in group guidance services to more optimally enhance students' learning independence.

Keywords: Group Guidance, Problem Solving, Learning Independence, Tetragrow

Abstract

Kemandirian belajar menjadi salah satu aspek penting dalam perkembangan pribadi dan karir siswa, namun masih banyak siswa yang belum mampu memiliki kesadaran dan pengelolaan terhadap proses belajaranya. Kemadirian belajar yang rendah mengakibatkan berbagai dampak negatif pada aspek-aspek kehidupan lain yang kurang mendukung optimalisasi potensi diri seorang siswa. Penelitian ini bertujuan untuk menegtahui efektivitas penggunaan media tetragrow sebagai inovasi dalam layanan bimbingan kelompok untuk meningkatkan kemandirian belajar. Penelitian ini menggunakan pendekatan kuantitatif dengan desain pre-experimental jenis one group pretest-posttest design. Subjek penelitian berjumlah tujuh siswa yang dipilih secara random. Instrumen penelitian ini mengadopsi instrumen kemandirian belajar yang telah diuji validitas dan reliabilitasnya sejumlah 50 item pernyataan. Analisis data menggunakan uji Wilcoxon Signed Ranks melalui aplikasi SPSS menunjukkan nilai Z = -2,379 dan signifikansi p = 0,017 (p < 0,05), yang berarti terdapat perbedaan signifikan antara skor pretest dan posttest. Hasil ini menunjukkan bahwa media tetragrow efektif dalam meningkatkan kemandirian belajar. Oleh karena itu, media Tetragrow direkomendasikan sebagai salah satu media pendukung dalam layanan bimbingan kelompok guna meningkatkan kemandirian belajar siswa secara lebih optimal.

Keywords: keyword 1; keyword 2; keyword 3 Bimbingan Kelompok, Problem Solving, Kemandirian Belajar, Tetragrow

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

1. Introduction

Learning independence is an important skill that needs to be developed in students as part of the educational process . This is because learning independence requires students not only to acquire knowledge but also to actively and responsibly manage their learning process. (Ali et al., 2022) . Learning independence is a student's ability to manage the learning process, recognize their potential, seek information, and make decisions regarding educational and career choices independently. (Sakinah et al., 2026) . Since junior high school, learning independence is very important because it can help students understand their interests and talents, and plan for the future according to their abilities. Students' ability to actively organize, monitor, and evaluate their learning process demonstrates learning independence (Zimmerman, 1989 ; Suhartono et al., 2024; Tarumasely, 2024) . High learning independence allows students to make better career decisions because they know their goals and potential (Wardana & Rosada, 2024).

The results of a student needs assessment at SMP Negeri 1 Magetan indicate that some seventh-grade students still experience obstacles in developing independent learning related to future planning and career development. This problem is not only evident in the students' inability to identify interests, but also in the lack of ability to connect self-understanding with realistic educational and career choices. (Ariyanti et al., 2026; Sahin & Sugiharto, 2025; Vonna & Hasmalawati, 2026) . Students do not yet have a clear picture of their ideals or career direction they wish to achieve . Therefore, the choices that emerge tend to be general, changeable, or not yet based on an understanding of their own characteristics and the demands of future education and work. (Cramer et al., 2023; McKenzie, 2024) . This is reflected in the less than optimal ability of students to compile and determine their choice of secondary school, identify competencies that need to be developed (Agustina et al., 2024) .

Based on the results of the analysis of student needs that has been carried out, it was found that the problem is not solely related to low learning results or activities, but shows a gap between self-understanding, decision-making abilities, educational planning, and career orientation. (Nurmaliya et al., 2026; Sun et al., 2026) . If this condition is not addressed, students have the potential to make educational decisions that are less focused because the choices made are not supported by adequate self-understanding and career planning. These findings are in line with Hamidah et al. (2022) who stated that low career readiness can hinder students in planning and making career decisions, as well as hinder their career maturity. The results of this assessment indicate the need for guidance and counseling services that help students recognize their potential, explore educational and career options, make appropriate decisions, and develop sustainable self-development plans.

Group guidance services are one way that can help students become more independent in determining their careers. (Sedyawati & Muslihati, 2025) . Students have the opportunity to learn through group dynamics, share opinions, and broaden their understanding of the problems they face through group guidance. Group guidance and problem-solving techniques can be used together to improve the services provided. (Jauhari, 2025) . Problem-solving methods help students identify problems, learn about their causes, find alternative solutions, and make independent decisions. A study by Wardana & Rosada (2024) found that group guidance services using a problem-solving approach were effective in increasing students' learning independence and helping them choose their own careers.

Researchers tested group guidance services using problem-solving techniques combined with Tetragrow media. Tetragrow media is an educational game designed to make

services fun and interactive so that students are actively involved. In this game, students are asked to answer various questions related to self-understanding, interests, talents, and career planning, and then discuss their answers in groups. There is evidence that the use of game media in guidance and counseling services can increase student participation in service activities. Hantoro et al., (2022) found that the Quartet Card game effectively improved students' career understanding. Thus, game-based media has a high potential to improve the quality of guidance and counseling services.

However, previous research still has research gaps. The study conducted by Wardana & Rosada (2024) focused on the application of problem-solving methods without incorporating interactive media. Meanwhile, research by Hantoro et al., (2022) only demonstrated the effectiveness of quartet cards in improving students' career understanding. They did not examine students' independent learning in determining their careers. To improve independent learning in determining their careers in junior high school students, there has been no specific research integrating problem-solving group guidance services with Tetragrow media to improve independent learning. Thus, service innovations are needed that not only help students understand career concepts but also teach them independent thinking and problem-solving through engaging activities tailored to student characteristics.

This study aims to determine whether group guidance services using problem-solving techniques using Tetragrow are effective in increasing learning independence and career determination in seventh-grade students of SMP Negeri 1 Magetan. The results of this study are expected to provide an alternative for innovative guidance and counseling services that can help students become more independent in their learning and prepare for their careers from the start.

2. Method

This study uses a quantitative approach with a pre-experimental one group pretest-posttest design method using a simple random sampling technique. The pre-experimental one group pretest-posttest design method is an experimental design on one group of subjects without a control group, with measurements taken before (pretest) and after (posttest) the treatment is given. (Adil et al., 2023; Syahroni, 2022) . The research was conducted in several stages, namely (1) pretest, students filled out the learning independence scale before participating in group guidance, (2) implementation of the intervention, group guidance services were provided in two sessions using tetragrow media, (3) posttest, students filled out the learning independence scale again to see changes in scores, (4) observation and reflective notes were also used to strengthen the quantitative results.



Applied to a single group of subjects, with no control group

The research subjects were 7 students of class VII B of SMPN 1 Magetan who were selected using simple random sampling techniques, so that each student in the class had the same opportunity to become a research sample. (Noor & Tajik, 2022) . The instrument in this study adopted the learning independence scale developed by Arga Wisnu Wardana. (Wardana

& Rosada, 2024) . To determine the level of validity and reliability, a trial was conducted on 60 statements, with 10 statements being dropped. Reliability in this study used the Cronbach Alpha formula with a total of 0.862 > 0.60. (Forester et al., 2024) .

Data were analyzed quantitatively using SPSS by calculating the average pretest and posttest scores . A Wilcoxon Signed-Rank Test was used to statistically assess whether there was an increase in career independence scores after the intervention. Success criteria were determined by an increase in the average score and a significance value of <0.05.

3. Results and Discussion

3.1 Result

This study was conducted on 7 students who were given *problem-solving technique group guidance services* using Tetragrow media to develop student learning independence. Data on student learning independence were obtained through measurements before (*pretest*) and after (*posttest*) the treatment was given and then analyzed using the Wilcoxon Signed Ranks Test to determine whether there were any significant differences. The results of the analysis showed that *problem-solving technique group guidance services* using Tetragrow media were effective in developing student learning independence. The overall increase in scores that occurred in all research subjects indicated that *problem-solving techniques* combined with Tetragrow media were able to encourage students to be more active in identifying their learning problems, formulating alternative solutions, and making independent decisions regarding their own learning process. The effect of group guidance can be seen from the Wilcoxon Test which showed that all participants (N = 7) experienced an increase in scores on the post-test compared to the pre-test.

Table 1. Wilcoxon test

Ranks

		N	Mean Rank	Sum of Ranks
Posttest - Pretest	Negative Ranks	0[a]	,00	,00
	Positive Ranks	7[b]	4,00	28,00
	Ties	0[c]		
	Total	7		

a. Posttest < Pretest

b. Posttest > Pretest

c. Posttest = Pretest

The increase in posttest scores compared to pretest scores is indicated by the Wilcoxon Signed Ranks Test results, which show a positive rank count of 7, while negative ranks and ties both amount to 0. This finding demonstrates that all seven participants experienced a measurable improvement in their scores following the intervention, with no participant showing a decrease or remaining at the same score level. The absence of any negative ranks is particularly noteworthy, as it indicates a consistent and uniform positive effect of the treatment across all subjects, regardless of their initial score category. This pattern of results suggests that the group counseling service using the problem-solving technique with Tetragrow media had a positive impact that was not limited to a specific subgroup of participants, but rather produced

improvement across the entire sample. Such consistency strengthens the argument that the observed increase in learning independence scores can be attributed to the intervention rather than to random variation or measurement error.

Table 2. Wilcoxon test

Test Statistics[a]

	Posttest - Pretest
Z	-2,379[b]
Asymp. Sig. (2-tailed)	,017

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

The statistical value of the Wilcoxon test obtained is Z = -2.379. Based on the table above, the Sig. (2-tailed) value is 0.017 < 0.05, so it can be concluded that Tetragrow media is effective in increasing learning independence in determining students' careers.

Table 3. *Pre-test and Post-test results scores*

No	Name/Initials	Pre-Test Score	Category	Post-Test Score	Category	Information
1	RAA	156	Tall	164	Tall	Increase
2	AEEA	125	Currently	142	Currently	Increase
3	AKJ	144	Currently	148	Currently	Increase
4	AZN	141	Currently	149	Currently	Increase
5	ZNT	172	Tall	177	Tall	Increase
6	AGH	150	Tall	167	Tall	Increase
7	YSB	129	Currently	130	Currently	Increase

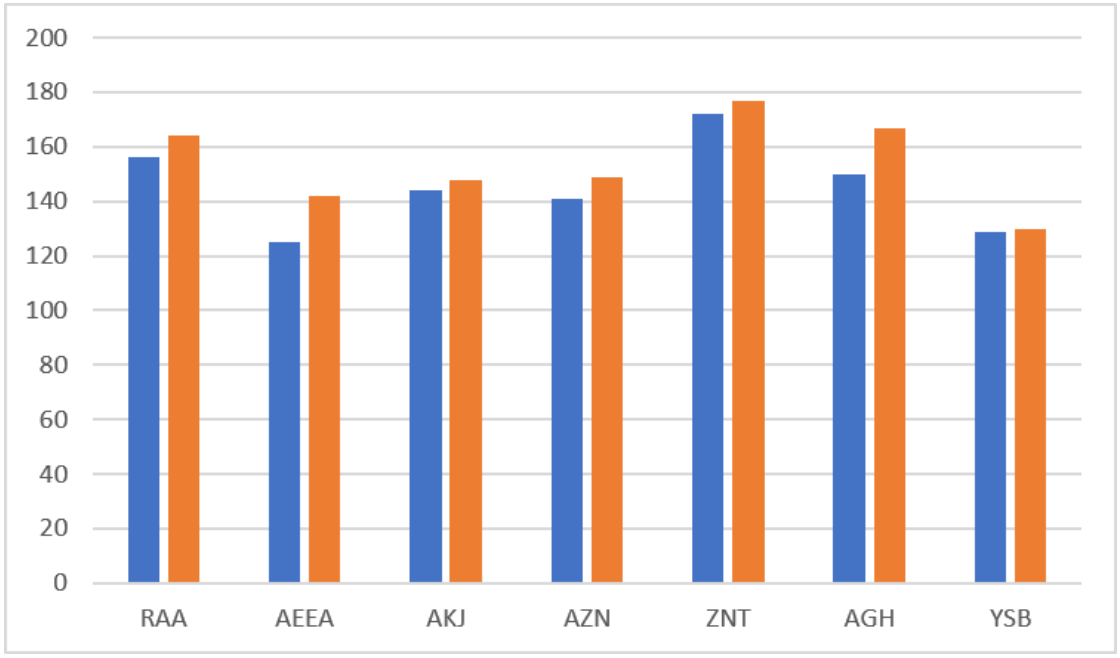


Figure 3. Pre-test and post-test result score chart

3.2 Discussion

The results of the study indicate that the problem-solving technique group guidance service using Tetragrow media is effective in developing students' learning independence. This is evidenced by the Z value = -2.379 and Asymp. Sig. (2-tailed) of 0.017 ($p < 0.05$), which means there is a significant difference between students' learning independence scores before and after being given treatment. All research subjects (N = 7) experienced an increase in posttest scores compared to the pretest, without a single student experiencing a decrease or a constant score, as indicated by the positive ranks value of 7 and negative ranks and ties of 0. This aligns with the view that group guidance is a service that utilizes group dynamics to help individuals achieve optimal development, including learning independence (Ramadani et al., 2022) . The group dynamics established within the service process provide students with the opportunity to share experiences, provide feedback, and learn from their peers' perspectives when addressing learning challenges. (Sitompul et al., 2025; Tadius & Purnamasari, 2026) .

The effectiveness of using Tetragrow in group guidance services was also evident in the pre-test and post-test evaluation results. Based on the score analysis, all participants experienced an increase in their level of independent learning in career decision-making after participating in group guidance services using Tetragrow. The post-test results showed higher scores than the pre-test scores for each group member. The effectiveness of using tetragrow media in group guidance services is evident from the results of the Wilcoxon Signed Ranks test. All participants (N = 7) showed an increase in their learning independence scores in determining their careers in the post-test. There was no decrease or constant score, and the test results showed a Z value of -2.379 with a significance of $p = 0.017$ ($p < 0.05$). Therefore, there was a significant difference between before and after the intervention, indicating that the use of tetragrow media was successful in significantly increasing students' learning independence in determining their careers.

Examining the pretest and posttest score data, improvements varied across subjects. Students with "moderate" learning independence generally showed a significant improvement in their scores, while students with "high" learning independence also continued to experience improvement despite their relatively good initial scores. This variation in improvement aligns with the notion that the effectiveness of a guidance intervention can be influenced by the initial conditions and individual characteristics of each student. (Dewi et al., 2026) . Therefore, the results of improvement are not always uniform, even though all subjects showed a positive direction of change. The use of Tetragrow media also plays a significant role in the effectiveness of this service. Visual and interactive learning media can increase students' understanding and active involvement in the guidance process.

Based on the results of the guidance services provided, it is known that creative and fun approaches such as the Tetragrow educational game can be an effective medium for group guidance. This game provides an active, interactive, and reflective learning experience, where students can develop independent learning and self-confidence through the courage to speak up, express opinions, take on roles, and accept challenges embedded in the game. This is supported by several previous studies. For example, research by Wardana and Rosada (2024) showed that group guidance services using problem-solving techniques were effective in increasing students' learning independence in career decisions. Similarly, research by Damayanti, Karamoy, and Wahyuni (2021) found that career guidance services can help students become more independent in making career decisions based on their potential and interests.

The improvement of student learning independence in this study was closely related to the application of *problem-solving techniques* . This technique encourages individuals to systematically identify problems, gather information, formulate alternative solutions, and evaluate and decide on the most appropriate solution (Habsy et al., 2024; Nahdliyin, 2023) . This process indirectly trains students to think critically and take responsibility for their own learning decisions, which is one of the main characteristics of independent learning. These results are in line with the characteristics of independent behavior , characterized by a free and responsible attitude, having initiative, being progressive and persistent, being able to control oneself, and having self-confidence in making decisions. (Ramadani et al., 2022) . This is evident in educational games like Tetragrow, where students gain hands-on learning experiences through discussions, problem-solving, and independent career-making activities. Furthermore, students learn from the experiences of their peers and receive social support throughout the game. Thus, the use of Tetragrow media not only increases student participation in group guidance services, but also becomes a means to build learning independence in determining careers more optimally.

4. Conclusion

The results of the study indicate that group guidance using problem-solving techniques combined with interactive Tetragrow media can help students improve their learning independence . Through activities packaged in the form of educational games, students are not only enthusiastic about participating in group guidance services, but they also find it easier to understand themselves, discover their interests and talents, and begin to think about and plan career choices that suit their potential. Students are motivated to think more actively, work together in groups, and be responsible for their decisions through the process of discussion, group collaboration, and solving challenges and questions in Tetragrow media. The results showed that all students who were the subjects of the study experienced an increase in learning independence after participating in the service. These findings indicate that the use of innovative, interactive, and close-to-the-students media can make BK services more meaningful and help develop students' abilities in preparing for their future careers from an early age. Thus, Tetragrow media can be used as an alternative innovation in effective group guidance services to help students become more independent in their learning.

References

Adil, A., Liana, Y., Mayasari, R., Lamonge, A. S., Ristiyana, R., Saputri, F. R., Jayatmi, I., Satria, E. B., Permana, A. A., & Rohman, M. M. (2023). Metode penelitian kuantitatif dan kualitatif: Teori dan praktik. *Jakarta: Get Press Indonesia*, *17*.

Agustina, M. T., Rahayu, P. P., Pratama Irwin Talenta, S. P., Nurkhasanah, A., & Hakati, K. T. (2024). *Bimbingan karir*. PT Publica Indonesia Utama.

Ali, S., Moonti, U., & Yantu, I. (2022). Pengaruh Motivasi Dan Kemandirian Belajar Terhadap Hasil Belajar Siswa Pada Mata Pelajaran IPS Terpadu Kelas VIII Di SMP Negeri 1 Bulango Utara Kabupaten Bone Bolango. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, *8*(2), 1553. https://doi.org/10.37905/aksara.8.2.1553-1560.2022

Ariyanti, H., Makaria, E. C., & Arsyad, M. (2026). Strategi Bimbingan Dan Konseling Dalam Mengembangkan Career Planning Siswa SMP. *JURNAL MANAJEMEN PENDIDIKAN*, *14*(02), 1777–1785.

Cramer, C., Brown, C., & Aldridge, D. (2023). Meta-reflexivity and teacher professionalism: Facilitating

multiparadigmatic teacher education to achieve a future-proof profession. *Journal of Teacher Education*, *74*(5), 467–480.

Dewi, R. S., Angelina, P. R., Kasman, R., Agustina, M. S., & Sholihah, N. (2026). Efektivitas layanan bimbingan kelompok untuk meningkatkan 21st century skills pada mahasiswa. *Jurnal Konseling Dan Pendidikan*, *14*(2), 71–86.

Forester, B. J., Khater, A. I. A., Afgani, M. W., & Isnaini, M. (2024). Penelitian kuantitatif: Uji reliabilitas. *EDU SOCIETY: Jurnal Pendidikan, Ilmu Sosial Dan Pengabdian Kepada Masyarakat*, *4*(3), 1812–1820.

Habsy, B. A., Febiyanti, D., Arsalan, F. I. P., Maulana, H., & Arfianti, Y. P. (2024). Basic Concepts of the Group Approach in Guidance and Counseling. *Jurnal Kajian Pendidikan Dan Psikologi*, *1*(3), 207–217.

Hamidah, T., Putri, O. F., Kurniawan, T., Puspitasari, E. I., Khotimah, K., & Suryawati, C. T. (2022). Problematika Bimbingan dan Konseling Bidang Karir Siswa SMK: A Systematic Literature Review (SLR). *Teraputik: Jurnal Bimbingan dan Konseling*, 5(3), 294-304.

Hantoro, R. W., Hartini, S., Prabowo, A. B., & Siswanti, R. (2022). Media permainan kartu kwartet untuk meningkatkan pemahaman karir siswa SMK. *Advice: Jurnal Bimbingan dan Konseling, 4*(1), 21–31.

Jauhari, M. I. A. A. B. (2025). Kajian Bimbingan Kelompok Teknik Problem Solving untuk Siswa. *Jurnal BK UNESA*, *15*(1), 164–171.

McKenzie, J. (2024). What do we want from a sociology of the future?: Exploring the epistemological needs of an emerging field. *Futures*, *158*, 103349.

Nahdliyin, C. (2023). Guidance and Counseling Program for Problem Solving Skills Development: A Literature Review. *Tadibia Islamika*, *3*(2), 74–80.

Noor, S., & Tajik, O. (2022). Simple Random Sampling. *International Journal of Educations and Language Studies*, *1*(2), 43–81. https://doi.org/10.1002/9780470374597.ch3

Nurmaliya, I., Sunarti, T., Hariyani, F., Ahlia, N. Z., & Nurwahyuwana, N. (2026). Karakteristik dan Transformasi Pelayanan Bimbingan dan Konseling dalam Sistem Pendidikan di Era Merdeka Belajar. *Journal of Social Humanities and Education*, *1*(3), 221–229.

Pitriana, E. N., Mahmudi, I., & Anggraini, A. (2024). Layanan bimbingan kelompok dengan teknik problem solving dalam meningkatkan kemandirian belajar siswa kelas VII SMPN 6 Madiun. *Jurnal* Review *Pendidikan dan Pengajaran*, 7(4), 17322-17329.

Polya, G. (2004). *How to solve it: A new aspect of mathematical method* (Expanded Princeton Science Library ed.). Princeton University Press. (Original work published 1945).

Ramadani, A. I. S., Alam, F. A., & Rauf, W. (2022). Implementasi bimbingan kelompok dalam upaya peningkatan kemandirian belajar siswa. *Jurnal Bimbingan Konseling Dan Psikologi*, *2*(1), 1–12.

Sahin, A., & Sugiharto, D. Y. P. (2025). *Persiapan karier masa depan: Peran guru dan konselor sekolah membangun adaptabilitas karier*. Cerdas Akademika Nusantara.

Sakinah, T. A., Mardatilah, W. Z., & Gusmaneli, G. (2026). Strategi pembelajaran aktif sebagai upaya meningkatkan kemandirian belajar siswa. *Maximal Journal: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya Dan Pendidikan*, *3*(4), 156–164.

Sedyawati, S., & Muslihati, M. (2025). Bimbingan Kelompok Teknik Modeling Untuk Mengoptimalkan Perencanaan Karier Siswa Sekolah Menengah Pertama: Kajian Naratif. *JKI (Jurnal Konseling Indonesia)*, *10*(2), 62–69.

Sitompul, R., Ginting, F. Y. A. G., & Sihotang, M. (2025). Students' Meaning-Making of Group Dynamics in Cooperative Learning: A Qualitative Study in Higher Education. *Jurnal Pendidikan, Media, Strategi, Dan Metode.*, 182–192.

Suhartono, S., Marlina, M., Suwandi, S., & Permana, D. (2024). Analisis faktor lingkungan keluarga dalam membentuk kemandirian belajar siswa. *Al-I'tibar: Jurnal Pendidikan Islam*, *11*(3), 232–241.

Sun, Y., Liu, Q., & Liu, X. (2026). The impact of career planning and self-concept on employability among university students: exploring the mediating role of learning attitudes. *Frontiers in Psychology*, *17*, 1818002.

Syahroni, M. I. (2022). Prosedur penelitian kuantitatif. *EJurnal Al Musthafa*, *2*(3), 43–56.

Tadius, K. K., & Purnamasari, S. E. (2026). Peningkatan Kemampuan Adaptasi Pola Belajar Siswa Melalui Support Group di SMP Negeri X. *HOSPITALITAS: Jurnal Pengabdian Kepada Masyarakat*, *3*(2), 8–17.

Tarumasely, Y. (2024). *Meningkatkan Kemampuan Belajar Mandiri (Panduan untuk Mengembangkan Self-Regulated Learning)*. Academia Publication.

Vonna, R. D., & Hasmalawati, N. (2026). Menata Masa Depan Sejak Dini: Pelatihan Career Planner pada Remaja.

ABDI KAMOE: JURNAL PENGABDIAN MASYARAKAT, *3*(1), 35–41.

Wardana, A. W., & Rosada, U. D. (2024). Keefektifan Layanan Bimbingan Kelompok Teknik Problem Solving untuk Meningkatkan Kemandirian Belajar dalam Menentukan Karir. *JISPENDIORA Jurnal Ilmu Sosial Pendidikan Dan Humaniora*, *3*(2), 209–219.

Zimmerman, B. J. (1989). Models of self-regulated learning and academic achievement. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theory, research, and practice* (pp. 1-25). Springer-Verlag.