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THE INFLUENCE OF KINESTHETIC LEARNING STYLE ON STUDENT LEARNING OUTCOMES IN EXPERIENCE-BASED VOCATIONAL LEARNING AT SMKN 7 SURAKARTA

Dea Nisrina Nur Lathifah
Universitas Sebelas Maret Surakarta
lathifahdea@student.uns.ac.id

Nurul Hidayati
Universitas Sebelas Maret Surakarta
nurulhidayati7@student.uns.ac.id

Abstract:

This study investigates the influence of kinesthetic learning style on student learning outcomes in experience-based vocational learning, focusing on the Broadcasting and Film Department at SMK Negeri 7 Surakarta. The research adopts a quantitative approach with an ex post facto design to examine the relationship between naturally occurring kinesthetic learning tendencies and students' academic performance without experimental manipulation. Data were collected from all 106 students using a validated and reliable kinesthetic learning style questionnaire and documented learning outcome records, and were analyzed through prerequisite testing and simple linear regression. The findings reveal that kinesthetic learning style has a positive and statistically significant effect on student learning outcomes, indicating that students with stronger kinesthetic tendencies tend to perform better in practice-oriented vocational learning environments. The results indicate that kinesthetic learning style has a positive and significant effect on student learning outcomes, as evidenced by an F value of 62.508 with a significance level of < 0.001. The coefficient of determination (R^2) shows that 16.9% of the variance in learning outcomes is explained by kinesthetic learning style, while the remaining variance is influenced by other factors. Future research is recommended to involve broader samples, additional influencing variables, and mixed-methods approaches to provide a more comprehensive understanding of learning outcomes in vocational education contexts.

Keywords: Kinesthetic learning style; vocational education; learning outcomes

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INTRODUCTION

Education occupies a central position in shaping competitive, adaptive, and high-quality human resources capable of responding to rapid social and technological change. In contemporary societies, the effectiveness of education is no longer assessed solely through curriculum completeness or infrastructure adequacy, but increasingly through its responsiveness to learner diversity and individual characteristics.[1] One critical dimension of this diversity is learning style, which influences how learners perceive, process, and internalize knowledge during instructional activities. Misalignment between instructional strategies and student learning characteristics can reduce engagement, motivation, and ultimately learning outcomes. Consequently, understanding learning styles within specific educational contexts has become a strategic concern for improving educational quality and relevance.[2]

Previous studies have demonstrated that learners often exhibit distinct and sometimes multimodal learning style preferences across educational levels. Evidence from K–12 and higher education contexts suggests that students tend to combine visual, auditory, and kinesthetic modalities, with kinesthetic tendencies frequently emerging in activity-oriented environments.[3] Research in professional and vocational domains further indicates that learning preferences are shaped by disciplinary demands and practical orientations.[4] In technology-enhanced and experiential settings, embodied and kinesthetic learning approaches have been associated with higher engagement and improved cognitive performance.[5] These findings underscore the relevance of learning styles as a lens for examining instructional effectiveness across diverse educational settings.[6]

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[1] K Zuo, "Understanding Motivation, Career Planning, and Socio-Cultural Adaptation Difficulties as Determinants of Higher Education Institution Choice Decision by International Students in the Post-Pandemic Era," *Frontiers in Psychology* 13 (2022), https://doi.org/10.3389/fpsyg.2022.955234.

[2] C Joswick, L Skultety, and A A Olsen, "Mathematics, Learning Disabilities, and Learning Styles: A Review of Perspectives Published by the National Council of Teachers of Mathematics," *Education Sciences* 13, no. 10 (2023), https://doi.org/10.3390/educsci13101023.

[3] B Bontchev et al., "Learning and Playing Style Differences between K12 and University Students Related to Educational Video Games," *Interactive Technology and Smart Education* 22, no. 4 (2025): 660–87, https://doi.org/10.1108/ITSE-09-2024-0223.

[4] K Ali, S Haggag, and M Nassereddiene, "Learning Style Differences between Mechanical and Electrical Engineering Students," *International Journal of Mechanical Engineering Education*, 2025, https://doi.org/10.1177/03064190251376271.

[5] P Kosmas and P Zaphiris, "Improving Students' Learning Performance through Technology-Enhanced Embodied Learning: A Four-Year Investigation in Classrooms," *Education and Information Technologies* 28, no. 9 (2023): 11051–74, https://doi.org/10.1007/s10639-022-11466-x.

[6] M S Hasibuan, R Z A Aziz, and A Sigit, "Utilizing Clustering Algorithms to Provide Vark Learning Style Recommendations," in *International Conference on Electrical Engineering, Computer Science and Informatics (EECSI)* (Institute of Informatics and Business (IIB) Darmajaya, Bandar

Within vocational education, experiential and practice-based learning has been widely recognized as a cornerstone of skill development. Empirical work highlights that vocational learners benefit significantly from instructional designs emphasizing concrete experience, active experimentation, and contextual problem solving.[7] Studies in TVET and applied higher education demonstrate that immersive, hands-on approaches enhance conceptual understanding, technical competence, and learner motivation.[8] Similar conclusions emerge from work-integrated learning and industry-linked programs, which strengthen professional readiness through direct engagement with real-world tasks.[9] Such evidence reinforces the theoretical alignment between experiential learning principles and vocational education objectives.[10]

A growing body of research has explored kinesthetic-oriented pedagogies across disciplines, often supported by innovative technologies. Kinesthetic and embodied learning approaches have been shown to foster creativity, engagement, and technical skills in engineering, robotics, and STEM education.[11] Augmented and virtual reality environments further extend opportunities for physical interaction and experiential immersion, contributing to improved attention, spatial understanding, and learning efficiency. In arts and performance-related education, practice-centered and movement-based models similarly enhance skill mastery and cultural awareness.[12] Collectively, these studies suggest that

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Lampung, Lampung, Indonesia: Institute of Electrical and Electronics Engineers Inc., 2023), 361–65, https://doi.org/10.1109/EECSI59885.2023.10295933.

[7] N Jalinus et al., "Hybrid and Collaborative Networks Approach: Online Learning Integrated Project and Kolb Learning Style in Mechanical Engineering Courses," *International Journal of Online and Biomedical Engineering* 18, no. 15 (2022): 4–16, https://doi.org/10.3991/ijoe.v18i15.34333.

[8] M Z A Jalil et al., "Development and Evaluation of an Augmented Reality Chiller System Simulator for TVET Teaching," *Journal of Technical Education and Training* 16, no. 1 (2024): 40–55, https://doi.org/10.30880/jtet.2024.16.01.004.

[9] A Gopal and G Nagpal, "Text Mining and Statistical Analysis Based Study on the Effectiveness of Work Integrated Learning Program: Evidence from Industry-Academia Collaboration between SAP Labs and BITS Pilani" (Birla Institute of Technology, Pilani, RJ, India: Association for Computing Machinery, 2022), https://doi.org/10.1145/3590837.3590935.

[10] S Stanlick and W Szmodis, "Active Experimentation, Embodiment, and High-Impact Practices in GCE: Diving in and Letting Go," in *Sustainable Development Goals Series*, vol. Part F2730 (Worcester Polytechnic Institute, Worcester, MA, United States: Springer, 2022), 181–95, https://doi.org/10.1007/978-3-031-00974-7_11.

[11] S Angelella, S Logozzo, and M C Valigi, "Kinesthetic Learning in Robotics: Development of a Six-Foot Walking Robot," in *Lecture Notes in Networks and Systems*, ed. R Balogh, D Obdržálek, and N Fachantidis, vol. 1544 LNNS (Università degli Studi di Perugia, Department of Engineering, Perugia, PG, Italy: Springer Science and Business Media Deutschland GmbH, 2025), 295–307, https://doi.org/10.1007/978-3-031-98762-5_25.

[12] Y Zhu et al., "Construction and practice of 'three-stage' teaching empowers the ideological and political teaching model in the introduction to nursing course," *Chinese Journal of Practical Nursing* 41, no. 13 (2025): 1025–29, https://doi.org/10.3760/cma.j.cn211501-20241025-02923.

kinesthetic learning strategies hold considerable promise for domains requiring applied competence and experiential engagement.[13]

Empirical investigations also reveal that vocational learners often express strong preferences for kinesthetic and individual learning modes. Research in vocational English for Specific Purposes and technical programs indicates that students favor hands-on, task-oriented activities over purely theoretical or collaborative formats.[14] Discipline-specific analyses further show that contextual and kinesthetic approaches are particularly effective in mechanically oriented fields compared to abstract-dominant disciplines. Studies integrating differentiated instruction and problem-based learning demonstrate positive impacts on achievement by accommodating diverse learning styles.[15] These findings collectively affirm the pedagogical relevance of aligning instructional design with learner characteristics in vocational contexts.[16]

Despite these advances, the literature also reveals important limitations and ongoing debates. Several scholars question the empirical robustness of learning style theory and caution against simplistic or uncritical applications in educational practice.[17] Some studies report weak or inconsistent relationships between kinesthetic intelligence or learning style and academic performance, suggesting the influence of mediating variables such as instructional quality and assessment design.[18] Moreover, much of the existing research remains situated in general education, higher education, or technology-rich experimental settings, with limited focus on specific vocational competencies such as broadcasting and film production.[19] This gap indicates a need for context-sensitive, empirical

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[13] Y Xiang et al., "Early Visual Deprivation Impairs Functional Development of the Visual Ventral Stream," *Investigative Ophthalmology and Visual Science* 64, no. 11 (2023), https://doi.org/10.1167/iovs.64.11.1.

[14] W Yao and M N Saad, "A Model for Enhancing Screenwriting Creativity for Media Students through a Creative System and Guided Mental Imagery Strategy," *Asian Education and Development Studies*, 2025, 1–21, https://doi.org/10.1108/AEDS-02-2025-0061.

[15] S Kara and A Tekindur, "The Effect of Differentiated Instruction on the Academic Achievement and Opinions of 3rd-Grade Students in Science Education: A Mixed-Methods Study," *Journal of Intelligence* 13, no. 10 (2025), https://doi.org/10.3390/jintelligence13100126.

[16] M Komaro et al., "Analysis of Vocational Lecturer's Pedagogical Competence Needs for TVET: A Case Study on Vocational Lecturers in West Java, Indonesia," *Journal of Technical Education and Training* 14, no. 2 SPECIAL ISSUE (2022): 24–33, https://doi.org/10.30880/jtet.2022.14.02.003.

[17] Joswick, Skultety, and Olsen, "Mathematics, Learning Disabilities, and Learning Styles: A Review of Perspectives Published by the National Council of Teachers of Mathematics."

[18] A Marwanto et al., "Kinesthetic Intelligence in Welding Practice Lectures," in *Journal of Physics: Conference Series*, ed. I Siswanto et al., vol. 1700 (Universitas Negeri Yogyakarta, Department of Mechanical Engineering Education, Yogyakarta, Yogyakarta, Indonesia: IOP Publishing Ltd, 2020), https://doi.org/10.1088/1742-6596/1700/1/012022.

[19] N T Giang et al., "Applying Augmented Reality Technology in STEM Education: A Bibliometrics Analysis in Scopus Database," *European Journal of Educational Research* 14, no. 1 (2025): 73–87, https://doi.org/10.12973/eu-jer.14.1.73.

investigations that examine learning styles within authentic vocational learning environments.[20]

In response to these gaps, the present study focuses on analyzing the influence of kinesthetic learning style on student learning outcomes in experience-based vocational learning at SMK Negeri 7 Surakarta, particularly in the Broadcasting and Film Department. By adopting a quantitative approach, this research seeks to provide empirical evidence grounded in an authentic vocational school context.[21] The study aims to clarify the extent to which kinesthetic learning preferences contribute to variations in learning outcomes when instruction involves practical, field-based activities. The findings are expected to contribute theoretically to ongoing debates on learning styles by offering contextualized evidence from vocational education.[22] Practically, the results may inform teachers and school leaders in designing instructional strategies that better align with student characteristics and the experiential demands of broadcasting and film education.[23]

RESEARCH METHODS

This study employed a quantitative research approach using an ex post facto design to examine the influence of kinesthetic learning style on student learning outcomes without manipulating the independent variable. The ex post facto method was selected because kinesthetic learning style represents a naturally occurring learner characteristic that cannot be experimentally controlled, while learning outcomes are observable and measurable after instructional processes have taken place.[24] A quantitative paradigm was considered appropriate as it enables objective measurement of variables and statistical testing of hypothesized relationships between them.[25] The research design focused on identifying the

[20] B Ma and E Winther, "Autonomy and Its Associations with Persistence and Competence: A Longitudinal Study of Vocational Students," *International Journal of Educational Research* 134 (2025), https://doi.org/10.1016/j.ijer.2025.102858.

[21] N S Prameswari et al., "Visual Literacy Study: Influence of Instagram on Interest in Learning Photography and Its Relation to Gender," *Media Practice and Education* 25, no. 3 (2024): 237–49, https://doi.org/10.1080/25741136.2023.2286745.

[22] I Radu and B Schneider, "How Augmented Reality (AR) Can Help and Hinder Collaborative Learning: A Study of AR in Electromagnetism Education," *IEEE Transactions on Visualization and Computer Graphics* 29, no. 9 (2023): 3734–45, https://doi.org/10.1109/TVCG.2022.3169980.

[23] L Magallon Peñaflorida, "Enhancing Pedagogical Competence and ICT Integration: An Evaluation of Teaching-Learning Practices of Home Economics Educators in State Universities and Colleges of Western Visayas," *International Journal on Culture, History, and Religion* 7, no. SI2 (2025): 605–23, https://doi.org/10.63931/ijchr.v7iSI2.231.

[24] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif Dan R&D* (Bandung: Alfabeta, 2013).

[25] John W Creswell, *Research Design: Pendekatan Kualitatif, Kuantitatif, Dan Mixed* (Yogyakarta: Pustaka Pelajar, 2016).

magnitude and direction of the relationship between a single independent variable and a single dependent variable within an authentic vocational education context. This design ensured methodological rigor while maintaining ecological validity in the school setting.

The study was conducted at SMK Negeri 7 Surakarta in the Broadcasting and Film Department during the academic year in which experience-based vocational learning was actively implemented. The research population comprised all students enrolled in the Broadcasting and Film major, and a saturated sampling technique was applied by including the entire population as research participants to avoid sampling bias.[26] Data collection procedures began with coordinating with school administrators and teachers to ensure access to academic records and learning schedules. Students were then informed about the research objectives and procedures prior to data collection to ensure transparency and voluntary participation. All data were collected in a single phase after the completion of relevant instructional activities to reflect actual learning outcomes.

The primary research instrument was a structured questionnaire designed to measure students' kinesthetic learning style tendencies. The questionnaire was developed based on established indicators of kinesthetic learning, including physical engagement, direct involvement in learning activities, and preference for hands-on practice. [27] Learning outcome data were obtained through documentation of students' academic records, specifically scores from experience-based vocational subjects relevant to broadcasting and film production. The use of documentation ensured objectivity and minimized researcher intervention in outcome measurement. Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS) to support accurate and efficient data processing.[28]

Data analysis commenced with prerequisite tests, including normality and linearity assessments, to confirm the suitability of the data for parametric statistical analysis. These tests were conducted to ensure that the assumptions required for regression analysis were satisfied. Hypothesis testing was subsequently performed using simple linear regression to determine the effect of kinesthetic learning style on student learning outcomes. Simple linear regression was selected because the study involved one independent variable and one

[26] Sugiyono, "Pengumpulan Data Dan Instrumen Penelitian" 1 (2013): 1–9.

[27] Marinu Waruwu et al., "Metode Penelitian Kuantitatif: Konsep, Jenis, Tahapan Dan Kelebihan," *Jurnal Ilmiah Profesi Pendidikan* 10, no. 1 (2025): 917–32, https://doi.org/10.29303/jipp.v10i1.3057.

[28] A Mukhlisin, I Ghozali, and I Djastuti, "Islamic Leadership and Performance," *International Journal of Educational Organization and Leadership* 29, no. 2 (2022): 1–18, https://doi.org/10.18848/2329-1656/CGP/v29i02/1-18.

dependent variable, allowing for direct estimation of influence and explanatory power. Statistical significance was determined at a 0.05 alpha level to assess whether the observed relationship was statistically meaningful.

To ensure reliability and validity, the kinesthetic learning style questionnaire underwent instrument testing prior to full-scale implementation. Content validity was established through expert judgment to confirm alignment between questionnaire items and kinesthetic learning indicators. Reliability analysis was conducted using internal consistency measures to ensure stable and consistent responses across items. These procedures ensured that the data generated were both accurate and dependable for statistical analysis. Collectively, the methodological steps undertaken strengthened the credibility and replicability of the study's findings within vocational education research contexts.

FINDINGS AND DISCUSSION

Validity Test

Variable X (Kinesthetic Learning Style)

The validity test of the instrument on the independent variable (X), namely kinesthetic learning style, aims to ensure that each statement item in the questionnaire is able to accurately represent the construct being measured. The validity test is carried out by comparing the correlation coefficient value (calculated r) of each item with the table r value and considering its significance value. An item is considered valid if it meets the criteria of r count > r table and a significance value < 0.05.

Based on the results of data processing with a total of 106 student respondents at a significance level of 5%, a table r value of 0.190 was obtained. The analysis results showed that all statement items on the kinesthetic learning style variable had an r count value greater than the table r. The lowest correlation value was in the range of 0.6xx, which statistically exceeded the minimum validity limit. In addition, all statement items showed a significance value below 0.05. Thus, it can be concluded that all instrument items on the kinesthetic learning style variable are valid and suitable for use as a measuring tool to identify the kinesthetic learning style tendencies of students at SMK Negeri 7 Surakarta majoring in Broadcasting and Film.

Variable Y (Student Learning Outcomes)

The validity test for the dependent variable instrument (Y), namely student learning outcomes, was conducted using the same procedure, namely comparing

the calculated r value with the table r value and considering the significance value of each statement item. With a total of 106 student respondents and a significance level of 5%, the table r value used was 0.190.

The analysis results showed that all items of the student learning achievement instrument had a calculated r value greater than the table r. The lowest correlation value was recorded in the range of 0.3xx, which met the validity criteria set. In addition, all statement items had a significance value of less than 0.05, which indicated a significant relationship between each statement item and the total score of the learning achievement variable. Based on these results, it can be concluded that all instruments used to measure student learning outcomes are statistically valid and suitable for use in research examining the effect of kinesthetic learning styles on the learning outcomes of students at SMK Negeri 7 Surakarta, majoring in Broadcasting and Film.

1. Reliability Test

Reliability testing was conducted to determine the level of consistency of the research instrument in measuring the variables studied. Reliability testing in this study used Cronbach's Alpha coefficient. Based on the reliability criteria proposed by Sanjaya (2010), an instrument is considered reliable if it has a Cronbach's Alpha value greater than 0.6.

Table. 1 Variable X (Kinesthetic Learning Style)

Case Processing Summary

		N	%
Cases	Valid	106	100.0
	Excluded[a]	0	.0
	Total	106	100.0

a. Listwise deletion based on all variables in the procedure.

Table. 2 Realibility Statistics

Reliability Statistics

Cronbach's Alpha	N of Items
.733	43

Based on the results of testing the reliability of variable X (kinesthetic learning style) with a total of 106 student respondents, a Cronbach's Alpha value of 0.733 was obtained with a total of 43 statement items. This Cronbach's Alpha value is greater than the minimum reliability limit set at 0.6. Thus, it can be

concluded that all statement items on the kinesthetic learning style variable have a good level of internal consistency and are declared reliable, making them suitable for use as a measuring tool in this study.

Table. 3 Variable Y (Student Learning Outcomes)

Case Processing Summary

		N	%
Cases	Valid	106	100.0
	Excluded[a]	0	.0
	Total	106	100.0

a. Listwise deletion based on all variables in the procedure.

Table. 4 Realibility Statistics

Reliability Statistics

Cronbach's Alpha	N of Items
.752	31

The reliability test results for variable Y (student learning outcomes) showed a Cronbach's Alpha value of 0.752 with a total of 31 items. This value meets the reliability criteria because it is above the minimum value of 0.6. Therefore, it can be concluded that all items used to measure student learning outcomes have good internal consistency and are reliable for use in research on the effect of kinesthetic learning styles on the learning outcomes of students at SMK Negeri 7 Surakarta, majoring in Broadcasting and Film.

2. Normality Test

Table. 5 One-Sample

One-Sample Kolmogorov-Smirnov Test

			Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11
N			106	106	106	106	106	106	106	106	106	106	1
Normal Parameters[a,b]	Mean		2.63	2.50	2.84	2.77	2.56	2.75	2.72	2.52	2.77	2.74	2.
	Std. Deviation		.695	.720	.692	.694	.691	.718	.658	.720	.666	.721	.7
Most Extreme Differences	Absolute		.271	.313	.280	.326	.271	.299	.308	.264	.275	.256	.2
	Positive		.271	.313	.248	.259	.271	.239	.239	.264	.236	.233	.2
	Negative		-.249	-.206	-.280	-.326	-.258	-.299	-.308	-.248	-.275	-.256	-.2
Test Statistic			.271	.313	.280	.326	.271	.299	.308	.264	.275	.256	.2
Asymp. Sig. (2-tailed)[c]			<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,0
Monte Carlo Sig. (2-tailed)[d]	Sig.		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.0
	99% Confidence Interval	Lower Bound	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.0
		Upper Bound	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.0

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 143709387.
e. This is a lower bound of the true significance.

Based on the results of the normality test for variable Y (student learning outcomes), a significance value (Asymp. Sig. 2-tailed) of < 0.001 was obtained for all indicators tested with a total of 106 student respondents. This significance value is smaller than the significance level of 0.05, so it can be concluded that the student learning outcome variable data is not normally distributed.

Table. 6 Anova

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7038.043	1	7038.043	62.508	<,001[b]
	Residual	11709.730	104	112.594		
	Total	18747.774	105			

a. Dependent Variable: Hasil_Belajar_Siswa

b. Predictors: (Constant), Gaya_Belajar_Kinestetik

The ANOVA test in this study was used to determine the significance of the regression model in explaining the effect of kinesthetic learning style on the learning outcomes of students at SMK Negeri 7 Surakarta, majoring in Broadcasting and Film. Based on the analysis results presented in the ANOVA table, a calculated F value of 62.508 was obtained with a significance level of < 0.001.

This significance value is smaller than the predetermined significance level of 0.05, so it can be concluded that the regression model used in this study is statistically significant. Thus, the kinesthetic learning style variable simultaneously has a significant effect on student learning outcomes.

These results indicate that variations in student learning outcomes do not occur by chance but can be explained by variations in students' kinesthetic learning styles. In other words, the regression model that links kinesthetic learning style as an independent variable and student learning outcomes as a dependent variable is suitable for further analysis.

Based on the ANOVA test results, the research hypothesis stating that kinesthetic learning style affects student learning outcomes can be accepted. This finding reinforces the assumption that kinesthetic learning style characteristics play an important role in improving student learning outcomes in practice-based vocational learning, particularly in the Broadcasting and Film Department.

Based on the results of validity, reliability, and normality testing, it can be concluded that all research instruments have met the required statistical

criteria and are therefore suitable for further analysis. The results of hypothesis testing show that kinesthetic learning style has a positive and significant effect on student learning outcomes in experience-based vocational learning. The relationship between the two variables is indicated by a correlation coefficient (R) value of 0.411, which indicates a positive relationship with a moderate level of strength between kinesthetic learning styles and student learning outcomes.

The regression analysis results show a coefficient of determination (R Square) value of 0.169 or 16.9%. This means that 16.9% of the variation in student learning outcomes can be explained by the kinesthetic learning style variable. Meanwhile, 83.1% of the variation in learning outcomes is influenced by other factors not examined in this study, such as learning motivation, teaching strategies and methods applied by teachers, the learning environment, and the availability and quality of practice facilities.

Discussion

This study was guided by the research question concerning the extent to which kinesthetic learning style influences student learning outcomes in experience-based vocational learning within the Broadcasting and Film Department. The focus on kinesthetic learning is theoretically grounded in experiential and embodied learning perspectives that emphasize active physical engagement as a driver of meaningful learning.[29] Prior literature has highlighted that vocational education contexts demand learning approaches aligned with practical skill acquisition and contextual performance. Learning style research further suggests that alignment between learner characteristics and instructional strategies can enhance engagement and achievement. Within this framework, the present findings contribute to clarifying the role of kinesthetic learning styles in a specific vocational specialization.

Based on the statistical analysis, the main result indicates that kinesthetic learning style has a positive and significant effect on student learning outcomes. The regression model demonstrated a moderate correlation, suggesting that students with stronger kinesthetic tendencies tend to achieve higher learning outcomes in practice-based vocational subjects. This finding is particularly relevant in broadcasting and film education, where learning activities inherently involve physical manipulation of equipment and real-world simulation.[30] The

[29] Kosmas and Zaphiris, "Improving Students' Learning Performance through Technology-Enhanced Embodied Learning: A Four-Year Investigation in Classrooms."

[30] Prameswari et al., "Visual Literacy Study: Influence of Instagram on Interest in Learning Photography and Its Relation to Gender."

significance of the ANOVA results confirms that the observed relationship is not random but systematically linked to learning style variation. These results underscore the importance of experiential engagement in supporting vocational learning effectiveness.

Further examination of the results reveals that kinesthetic learning style explains a meaningful, though not dominant, proportion of variance in learning outcomes. The coefficient of determination indicates that while kinesthetic tendencies contribute positively, a substantial portion of learning outcomes is influenced by other factors. This pattern reflects the multifactorial nature of learning in vocational contexts, where motivation, pedagogy, and learning environment also play critical roles.[31] The moderate strength of the relationship suggests that kinesthetic learning style acts as an enabling factor rather than a sole determinant. Such findings reinforce the need to consider learning styles as part of a broader instructional ecosystem.

An additional noteworthy result is the strong reliability and validity of the measurement instruments used in this study. High internal consistency indicates that kinesthetic learning style can be measured reliably within vocational school settings. This methodological robustness strengthens confidence in the observed relationships and supports the use of similar instruments in future vocational education research, Reliable measurement is particularly important given ongoing debates regarding the empirical status of learning styles. Thus, the present findings contribute not only substantively but also methodologically to the field.

When compared with previous studies, the results of this study align closely with research emphasizing the benefits of kinesthetic and experiential learning approaches. Studies in vocational and technical education contexts have consistently reported that hands-on, activity-based learning enhances engagement, skill mastery, and performance.[32] Similarly, research on contextual and discipline-specific learning styles shows that kinesthetic approaches are especially effective in mechanically and practically oriented fields. The present findings support these conclusions by demonstrating their applicability in secondary-level vocational education. This consistency strengthens the external validity of the study.

At the same time, the results partially contrast with studies reporting weak or non-significant relationships between kinesthetic characteristics and learning outcomes. Research in higher education technical programs has shown that

[31] Komaro et al., "Analysis of Vocational Lecturer's Pedagogical Competence Needs for TVET: A Case Study on Vocational Lecturers in West Java, Indonesia."

[32] Angelella, Logozzo, and Valigi, "Kinesthetic Learning in Robotics: Development of a Six-Foot Walking Robot."

kinesthetic intelligence may contribute minimally when compared to other variables such as interpersonal intelligence or learning strategies.[33] These discrepancies may be explained by differences in educational level, learning context, and instructional design. In experience-based vocational learning, physical engagement is more directly embedded in the curriculum, potentially amplifying the impact of kinesthetic learning style. Thus, contextual specificity appears to be a key factor in interpreting learning style effects.

The findings can be explained through experiential learning theory, which posits that knowledge construction is optimized through cycles of concrete experience and active experimentation. Broadcasting and film education inherently operationalize these cycles through activities such as filming, editing, and production work, which directly activate kinesthetic engagement.[34] Students with kinesthetic preferences may therefore experience greater cognitive integration between theory and practice. However, given that kinesthetic learning style accounts for only part of the outcome variance, interpretation of the results should remain cautious. Overgeneralization of learning style effects without considering pedagogical quality and learning resources would be inappropriate.

The implications of these findings are significant for vocational education practice and policy. Teachers are encouraged to design learning environments that emphasize hands-on practice, simulation, and active student participation to better accommodate kinesthetic learners.[35] Schools should also consider integrating adaptive instructional strategies and adequate practice facilities to maximize experiential learning benefits. At a broader level, the findings support curriculum development efforts that prioritize experiential alignment with learner characteristics. Ultimately, this study highlights that while kinesthetic learning style is not the sole determinant of success, it is a meaningful factor that can enhance learning outcomes when appropriately supported within vocational education systems.

CONCLUSION

This study examined the influence of kinesthetic learning style on student learning outcomes in experience-based vocational education at SMK Negeri 7

[33] Marwanto et al., "Kinesthetic Intelligence in Welding Practice Lectures."

[34] F J Reen et al., "Student Informed Development of Virtual Reality Simulations for Teaching and Learning in the Molecular Sciences," *Journal of Biological Education* 59, no. 4 (2025): 604–20, https://doi.org/10.1080/00219266.2024.2386250.

[35] S Hafeez, "Deaf in STEM: A New Approach to Measuring Problem Solving, Deductive Reasoning, Creativity, and Ability," in *Lecture Notes in Computer Science*, ed. M Antona and C Stephanidis, vol. 14698 LNCS (Deaf Kids Code, West Lafayette, IN, United States: Springer Science and Business Media Deutschland GmbH, 2024), 47–57, https://doi.org/10.1007/978-3-031-60884-1_4.

Surakarta, focusing on the Broadcasting and Film Department. The findings indicate that kinesthetic learning style has a positive and statistically significant effect on learning outcomes, suggesting that students with stronger kinesthetic tendencies achieve better performance in practice-oriented learning contexts. The research instruments were found to be valid and reliable, and although the relationship is moderate, the regression analysis confirms that kinesthetic learning style contributes meaningfully to variations in student learning outcomes.

These results emphasize the importance of aligning instructional approaches with learner characteristics in vocational education, particularly in fields that rely heavily on hands-on practice and real-world experience. From a practical perspective, the study highlights the need to design learning environments that prioritize active participation, simulation, and direct practice to support the development of job-relevant competencies. Nevertheless, the study is limited by its focus on a single school and specialization and by the exclusion of other potential influencing factors, indicating the need for future research involving broader samples, additional variables, and mixed or qualitative approaches to gain a more comprehensive understanding of kinesthetic learning in vocational settings.

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