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Analysis of Literacy and Numeracy Skills in Enhancing Garment Production Competencies Among Fashion Technology Vocational Training Students

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ABSTRACT

The growing demand for skilled workers in Indonesia's textile and garment industry highlights the importance of foundational competencies in vocational training. This study explored the role of literacy and numeracy skills in supporting garment production competencies among trainees in the Fashion Technology program at *Balai Besar Pelatihan Vokasi dan Produktivitas Semarang*. A qualitative approach was employed involving 15 trainees who completed literacy, numeracy, and competency assessments, supported by semi-structured interviews with three trainees representing different ability levels and two instructors. Assessment results showed that 53% of trainees demonstrated high literacy skills, 47% showed high numeracy skills, and 53% achieved high garment production competency. Interview findings indicated that literacy skills supported trainees' ability to understand technical terminology, interpret work instructions, and follow production procedures, while numeracy skills facilitated accurate measurements, calculations, and technical decision-making. The findings suggest that literacy and numeracy function as important enabling factors in competency development. This study contributes to vocational education literature by providing empirical evidence on how foundational skills are embedded in nonformal fashion training and support workforce preparation in the garment industry.

1. INTRODUCTION

The growth of the textile and garment industry in Indonesia has shown significant development. Data from Statistics Indonesia (BPS), published in Kompas.com, reported that in the fourth quarter of 2025, the textile and textile products industry achieved a growth rate of 4.37 percent (Kompas.com, 2025). The Directorate of Textile, Leather, and Footwear Industries of the Ministry of Industry also stated that from January to March 2025, there was an increase in investment in the textile and garment industry sector, which was estimated to create 1,907 new job opportunities (Kumparan, 2025). Field data indicate that the increasing growth of the textile industry has created broader opportunities for labor absorption. This growth reflects positive development in the fashion industry sector. An analysis of the labor market and domestic industrial needs in 2025 revealed a mismatch between industrial demands and workforce availability, particularly because many high school and vocational high school graduates have not yet met the competency standards required by companies. To address the mismatch between industrial needs and the competencies of the available workforce, it is necessary to improve human resource competencies through nonformal education in the form of vocational training. Research

conducted in Brazil demonstrated that nonformal education plays a strategic role as a complement to formal education because it provides alternative solutions to educational access limitations while offering opportunities for communities to acquire skills, knowledge, and stronger work attitudes (Pegurer-Caprino, 2016). Modern vocational education faces major challenges in preparing a workforce that is not only technically skilled but also capable of critical thinking, communication, and adaptability to industrial dynamics. In this context, literacy and numeracy skills are regarded as important foundations in the development of trainees' competencies. Research also emphasizes that the development of work competencies and human resource quality in nonformal education plays a crucial role in improving workforce readiness to face changes in modern industries (Cahyani, 2025).

Literacy is not merely defined as the ability to read and write, but also as the ability to understand, interpret, and apply information in learning processes and workplace practices. In the context of training, literacy refers to the ability to integrate reading, writing, speaking, listening, and critical thinking skills to understand, interpret, and communicate information effectively (Perkins, 2019). Research has revealed that literacy skills are not only related to cognitive aspects but are also influenced by social interaction, learning motivation, and their application in daily life practices (Lang, 2021). In vocational training, participants who are accustomed to reading pattern instructions, understanding material descriptions, and writing work reports tend to demonstrate better competencies. This finding indicates that literacy develops contextually through learning experiences that integrate theory and practice. Literacy in training is therefore contextual in nature. Meanwhile, numeracy relates to the ability to use numbers, symbols, and quantitative logic in solving problems involving calculations, measurements, and data analysis.

In addition to literacy, numeracy also plays a significant role in competency development. Experimental findings revealed that numeracy literacy significantly influences the improvement of critical and creative thinking skills (Salsabila & Fatah, 2023). These results confirm that numeracy not only supports academic abilities but also shapes reflective and creative thinking patterns, which are important foundations for the development of competencies among fashion technology trainees. Studies explain that numeracy in the fashion field is related to the processes of reading data and numbers, calculating proportions, taking measurements, performing calculations, and understanding pattern and design structures (Magri & Ciarletta, 2023). Numeracy serves as an important foundation for understanding garment production processes. These processes involve concepts of geometry, body measurements, and the calculation of proportions and angles to ensure that the resulting patterns produce appropriate garment forms when sewn.

Literacy and numeracy skills interact with one another in supporting the mastery of vocational competencies, particularly in fields such as fashion technology that require precision, creativity, and analytical abilities. Various studies indicate that literacy and numeracy play essential roles in supporting the success of competency-based learning. Research findings also emphasize that literacy and numeracy are important indicators in the development of global competencies and workforce competitiveness (Tian et al., 2023). Trainees with strong literacy and numeracy skills tend to be more adaptive to technological developments and industrial needs. Furthermore, systematic review findings demonstrate that literacy and numeracy contribute to critical thinking, problem-solving abilities, and students' career readiness (Rahmania et al., 2024). Research on the performance of vocational education tutors also indicates that competency quality and work performance are strongly influenced by basic skills, resilience, and motivation within vocational learning processes (Avrilianda et al., 2025). Learning environments, instructional strategies, and educators' roles also determine the effectiveness of competency development.

Competency is defined as the result of integrative learning experiences that encompass skills, abilities, and knowledge interacting to form a set of learning outcomes associated with the tasks being performed (Baughman et al., 2019). This definition aligns with the view that competency is a fundamental characteristic of individuals that supports successful performance in work and organizational settings, including aspects of knowledge, skills, and work attitudes in accordance with established standards (Wong, 2020). Work competency is further specified in the Regulation of the Minister of Manpower of the Republic of Indonesia No. 6 of 2025 concerning Guidelines for Competency-Based Training, particularly Chapter I, Article 1 Paragraph 3, as an individual's ability to perform work according to established standards. The results of the competency test for the Fashion Technology Training Program Cohort 4 of 2025 involving 32 participants showed that 26 participants were declared competent, while 6 participants were not yet competent. Evaluation results and interviews with assessors indicated that the failure to achieve competency was related to participants' limited basic abilities, particularly literacy and numeracy skills. This condition suggests that literacy and numeracy abilities are likely to influence competency achievement in Fashion Technology training and therefore require further investigation through research.

This study was conducted at *Balai Besar Pelatihan Vokasi dan Produktivitas Semarang*, a vocational training institution under the Ministry of Manpower of the Republic of Indonesia that plays a strategic role in improving workforce competencies through various competency-based training programs. One of the programs offered is the Fashion Technology training program, which aims to equip participants with technical skills in the fashion field according to work competency standards. During the learning process, participants are not only required to possess practical skills but also the ability to understand training modules, read work instructions, interpret symbols or measurements in patterns, and perform calculations related to garment production processes.

Although numerous studies have examined the importance of literacy and numeracy, most previous research has been conducted in formal education settings, particularly in primary, secondary, and higher education contexts. Existing studies generally focus on academic achievement, learning outcomes, critical thinking, or career readiness, while relatively limited attention has been given to how literacy and numeracy contribute to competency development in nonformal vocational training environments. Moreover, empirical evidence remains scarce regarding literacy and numeracy practices within fashion technology training, where competency achievement depends not only on theoretical understanding but also on the ability to interpret technical instructions, calculate measurements accurately, analyze design specifications, and apply these skills in garment production processes.

Consequently, there is still insufficient evidence explaining how literacy and numeracy skills are manifested, utilized, and associated with competency achievement in vocational fashion training contexts. This gap is particularly important because the competency demands of the garment and fashion industry require the integration of cognitive, technical, and analytical skills that are closely related to literacy and numeracy capabilities. Examining these skills within garment production training therefore offers a meaningful contribution to vocational education literature by extending existing knowledge beyond formal education settings and providing empirical insights into competency development in nonformal workforce preparation programs.

Based on these considerations, this study aims to explore the role of literacy and numeracy skills in supporting competency achievement among trainees in a fashion technology vocational training program at BBPVP Semarang. By focusing on a nonformal vocational education context, the study seeks to address the limited empirical evidence

regarding literacy and numeracy in fashion training while contributing to a better understanding of the foundational competencies required for workforce preparation in the growing textile and garment industry.

2. METHODS

The research method used in this study was qualitative research. A qualitative approach was considered relevant for understanding the experiences of trainees and instructors in integrating literacy and numeracy into daily learning practices. Qualitative research is defined as research that originates from data, utilizes existing theories as explanatory tools, and ultimately generates a theory (Fatah, 2023). Qualitative research is also described as a type of research whose findings are not obtained through statistical procedures but rather emphasize how researchers understand and interpret the meanings of events, interactions, and participants' behaviors in particular situations based on the researchers' perspectives (Fiantika et al., 2022).

The purpose of this study was to analyze the literacy and numeracy skills of trainees and their relationship with the achievement of garment production competencies in fashion technology training. The study was conducted at *Balai Besar Pelatihan Vokasi dan Produktivitas Semarang* in April 2026. The research subjects consisted of 15 trainees enrolled in the Fashion Technology vocational training program who had completed literacy, numeracy, and competency assessments. The inclusion of all 15 trainees was intended to provide a comprehensive overview of the variation in literacy, numeracy, and competency achievement within a single training cohort. Because the number of trainees in the cohort was relatively small, all participants who completed the training and assessment process were included in the study to maximize data representation and contextual understanding. Based on the assessment results, trainees' abilities were classified into three categories: low, moderate, and high levels. Furthermore, to obtain deeper insights into trainees' thought processes and learning experiences, in-depth interviews were conducted.

The interviews in this study employed a semi-structured interview technique. Semi-structured interviews are conducted using a prepared list of questions; however, the order and development of the questions remain flexible according to the flow of the conversation, allowing researchers to obtain consistent data from each participant more efficiently (Suriani et al., 2023). This interview format was selected because it enabled the researcher to explore participants' experiences in greater depth while maintaining consistency across interviews. An interview guide was developed covering literacy practices, numeracy application, learning experiences, challenges encountered during training, and perceptions regarding competency achievement. Interviews were conducted with three trainees selected as key informants, consisting of one trainee with low literacy and numeracy skills, one trainee with moderate literacy and numeracy skills, and one trainee with high literacy and numeracy skills. These three trainees were purposively selected because they represented distinct ability profiles, enabling cross-case comparisons and facilitating a deeper understanding of how literacy and numeracy skills were associated with competency development across different performance levels.

The selection of subjects was carried out using purposive sampling techniques. Purposive sampling is a sampling technique in which participants are intentionally selected based on specific considerations (Suriani et al., 2023). The sampling considerations were based on the suitability of the subjects' characteristics with the objectives of the study. To strengthen the research findings, interviews were also conducted with two instructors who taught garment production competencies in the Fashion Technology program. The instructors were selected because they were directly involved in delivering training materials, assessing trainees' competencies, and integrating literacy and numeracy practices

into garment production activities. Their perspectives were considered important for validating and complementing the information obtained from trainees.

The data collection techniques in this study involved both primary and secondary data. Primary data refer to data obtained directly from original sources through interviews, surveys, or experiments, whereas secondary data are derived from existing documents such as publications or reports (Undari Sulung, 2024). Secondary data functioned to strengthen and validate the findings obtained from interviews and assessments.

Primary data were obtained through in-depth interviews with trainees and training instructors. Interviews in qualitative research can be used to explore subjective understanding and the meanings individuals assign to their experiences (Priang, 2023). Interviews with trainees were conducted face-to-face and lasted approximately 30–45 minutes per participant, allowing the researcher to explore their experiences in understanding training materials, reading modules, comprehending work instructions, and applying numeracy skills in garment production activities. Interviews with instructors focused on learning strategies, methods of delivering materials and work instructions, the integration of literacy and numeracy into practical activities, and factors influencing trainees' competency achievement. Meanwhile, secondary data were obtained through documentation studies in the form of literacy, numeracy, and competency assessment results.

The literacy assessment evaluated trainees' abilities to read, understand, interpret, and communicate information contained in training modules and workplace instructions. The numeracy assessment measured participants' abilities related to calculations, measurements, proportions, and quantitative reasoning required in garment production activities. Competency assessment data were obtained from the official competency evaluation conducted by the training institution based on established garment production standards. The assessment instruments had previously been developed and used by the institution as part of the competency-based training and evaluation system.

The data analysis technique used in this study was the interactive analysis model. According to the theory of Miles and Huberman, the analysis model consists of three main stages: data reduction, data presentation, and conclusion drawing (Ahmad & Muslimah, 2021). Data reduction was carried out by selecting, focusing, and simplifying data relevant to the research objectives. Subsequently, the reduced data were presented in the form of narrative descriptions to facilitate the identification of patterns and relationships among the data. Coding procedures were conducted iteratively to identify recurring themes related to literacy practices, numeracy application, learning experiences, and competency achievement. Similar codes were grouped into broader categories before being interpreted to develop meaningful findings. The final stage involved drawing conclusions through the interpretation of the analyzed data to obtain an understanding of the relationship between literacy skills, numeracy skills, and trainees' competency achievement.

To ensure data validity, this study employed triangulation techniques. Triangulation is an effort to test the validity of data or information by examining findings from multiple perspectives (Ilhami et al., 2024). This process was intended to minimize ambiguity and multiple interpretations that might arise during data collection and analysis. Triangulation was conducted through source triangulation and method triangulation. Source triangulation is a type of triangulation used to verify data by involving several informants as sources of information (Susanto et al., 2023). This verification was conducted by examining and comparing data obtained from various sources or informants during the research process to enhance data credibility.

Source triangulation was carried out by comparing information obtained from trainees with different literacy, numeracy, and competency levels and by comparing trainees'

perspectives with those of instructors. Method triangulation was conducted by comparing data or information obtained through various methods or techniques (Husnullail et al., 2024). Method triangulation was performed by comparing interview findings with documentation data related to trainees' literacy, numeracy, and competency assessment results. In addition, credibility was strengthened through prolonged engagement during the training period, careful documentation of the research process, and repeated examination of interview transcripts and field notes to ensure consistency in data interpretation. Through these techniques, the obtained data were expected to be more valid and scientifically accountable.

3. RESULTS AND DISCUSSION

3.1 Results

This study aimed to explore the role of literacy and numeracy skills in supporting garment production competencies among trainees in the Fashion Technology training program at BBPVP Semarang. Based on the literacy, numeracy, and competency test results of 15 trainees, literacy skills were predominantly categorized as high (8 trainees), followed by moderate (4 trainees) and low (3 trainees). Numeracy skills showed a more balanced distribution, consisting of 7 trainees in the high category, 4 in the moderate category, and 4 in the low category. Similarly, garment production competencies were dominated by the high category (8 trainees), followed by moderate (4 trainees) and low (3 trainees). The relatively similar distribution patterns across literacy, numeracy, and competency categories suggest a possible association between foundational skills and competency achievement. However, because this study employed a qualitative approach, these patterns should be interpreted as observed tendencies rather than direct causal relationships.

3.1.1 Theme 1. Literacy as a Foundation for Understanding Technical Information and Work Instructions

Interview findings revealed substantial differences in trainees' ability to comprehend written information, technical terminology, and lengthy instructional texts. Trainees with lower literacy levels frequently reported difficulties understanding fashion-related terminology and interpreting complex written instructions. These challenges often affected their ability to understand test questions, follow procedural directions, and manage their time effectively during assessments and practical activities. In contrast, trainees with higher literacy levels demonstrated stronger comprehension, greater accuracy in interpreting questions, and more efficient completion of tasks.

The findings suggest that literacy functions as an essential foundation for garment production learning because trainees are required to read modules, understand pattern-making instructions, interpret technical specifications, and follow procedural sequences accurately. In garment production settings, misunderstanding written instructions may lead to procedural errors, reduced efficiency, and lower-quality outputs. Therefore, literacy appears to support competency development not merely through reading ability itself but through facilitating access to technical knowledge and workplace procedures. This interpretation aligns with previous studies emphasizing that literacy contributes to information processing, critical thinking, and successful competency achievement in vocational learning environments (Sari, 2018).

3.1.2 Theme 2. Numeracy as a Supporting Skill for Accuracy and Technical Decision-Making

A second major theme concerned the role of numeracy in supporting measurement accuracy and technical calculations during garment production activities. Interview data showed that trainees with lower numeracy levels experienced difficulties performing percentage calculations, unit conversions, proportional measurements, and multi-step

mathematical operations. These difficulties often became more pronounced when numerical information was embedded within lengthy contextual problems.

Conversely, trainees with stronger numeracy skills demonstrated more systematic problem-solving strategies. They tended to interpret the context of problems before performing calculations and applied mathematical procedures sequentially to ensure accuracy. Such findings indicate that numeracy in vocational fashion training extends beyond simple arithmetic skills. Rather, numeracy enables trainees to translate measurements, dimensions, and design specifications into accurate garment patterns and production decisions.

This finding is particularly important because garment production requires precise calculations involving body measurements, pattern grading, fabric consumption, and proportional design adjustments. Small numerical inaccuracies may influence the quality and fit of finished products. Consequently, numeracy appears to function as a practical workplace skill that supports technical precision and decision-making. This interpretation is consistent with previous research suggesting that numeracy contributes to logical reasoning and contextual problem-solving abilities (Yamashita et al., 2018).

3.1.3 Theme 3. Competency Achievement as the Integration of Literacy, Numeracy, and Practical Experience

The analysis of competency interviews demonstrated that trainees with higher competency levels generally exhibited stronger abilities to understand work procedures, evaluate alternative methods, and select efficient production strategies. Meanwhile, trainees with lower competency levels tended to depend heavily on instructor demonstrations and struggled to transfer previously learned procedures to unfamiliar situations.

Importantly, the findings indicate that competency achievement cannot be explained solely by technical practice. Both trainees and instructors consistently described competency as involving the ability to understand instructions, interpret procedural information, perform accurate calculations, and apply technical knowledge appropriately during practical tasks. This suggests that literacy and numeracy operate as supporting resources that enable trainees to engage more effectively with vocational learning experiences.

The instructors further emphasized that competency development was influenced not only by literacy and numeracy but also by learning motivation, discipline, and practical experience. This finding highlights the multidimensional nature of vocational competence and suggests that literacy and numeracy should be viewed as important enabling factors rather than independent determinants of competency achievement. Therefore, the relationship observed in this study is better interpreted as an interaction among foundational skills, learning experiences, and workplace-oriented training practices.

3.2 Discussion

The findings provide evidence that literacy and numeracy play meaningful roles in supporting garment production competencies within vocational fashion training. However, their contributions appear to operate through different mechanisms. Literacy primarily supports the comprehension and interpretation of technical information, while numeracy facilitates measurement accuracy, calculation processes, and technical decision-making. Together, these skills help trainees engage more effectively with vocational learning tasks and workplace simulations.

These findings extend previous vocational education research by demonstrating how literacy and numeracy function within a highly practice-oriented training environment. While earlier studies have frequently examined literacy and numeracy within formal education contexts, the present study highlights their practical relevance in garment

production activities where reading instructions, interpreting technical terminology, calculating measurements, and following production procedures are integral parts of everyday learning. The findings therefore contribute to the growing international discussion on foundational skills in vocational education by showing that literacy and numeracy are embedded within authentic workplace practices rather than existing as separate academic competencies.

The study also suggests important implications for vocational training institutions. Literacy and numeracy development should not be treated as standalone subjects but integrated into practical learning activities. Instructors can strengthen literacy by incorporating guided reading of technical modules, procedural texts, and workplace documentation, while numeracy can be reinforced through measurement-based tasks, pattern calculations, and production simulations. Such integration may help trainees develop both technical competencies and the foundational skills required to perform effectively in contemporary fashion industry environments.

Nevertheless, the findings should be interpreted cautiously. The study involved only 15 trainees from a single training institution and relied primarily on qualitative exploration supported by test results. Therefore, the observed relationships should be understood as patterns emerging from participants' experiences rather than definitive evidence that literacy and numeracy directly cause higher competency achievement. Future research involving larger samples, multiple vocational institutions, and mixed-methods designs would provide a stronger basis for examining how foundational skills contribute to vocational competency development across different training contexts.

4. CONCLUSION

This study found that literacy and numeracy skills play important roles in supporting garment production competencies among trainees in the Fashion Technology training program at BBPVP Semarang. Literacy skills contributed to trainees' ability to understand technical terminology, interpret work instructions, and apply procedural knowledge, while numeracy skills supported measurement accuracy, calculation processes, and technical decision-making during garment production activities. The findings also indicate that competency achievement is influenced not only by literacy and numeracy but also by learning motivation, discipline, practical experience, and instructional support, highlighting the multidimensional nature of vocational competence. These results suggest that vocational training institutions, instructors, and curriculum developers should integrate literacy and numeracy more systematically into competency-based learning through technical reading activities, workplace documentation, measurement-based tasks, and authentic production simulations. Such integration may strengthen workforce preparation and better align vocational training outcomes with the competency demands of the growing textile and garment industry.

5. CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

6. REFERENCES

Ahmad & Muslimah. (2021). Memahami teknik pengolahan dan analisis data kualitatif. *Proceedings, 1*(1), 173–186.

Avrilianda, D., Shofwan, I., & Anwar, R. R. (2025). Study tutors' performance at the Sanggar Kegiatan Belajar (SKB) in East Java, Indonesia: The impact of welfare, resilience, and work motivation. *Jurnal Penelitian Pendidikan, 42*(1), 24–31. https://doi.org/10.15294/jpp.v42i1.24279

Baughman, J. A., Brumm, T. J., & Mickelson, S. K. (2009). *Student professional development:*

Competency-based learning and assessment.
Cahyani, A. D., Arbarini, M., & Suminar, T. (2025). Manajemen program pendidikan kecakapan hidup dalam meningkatkan kemandirian peserta didik di PKBM Handayani Bojonegoro. *BEduManagers Journal: Borneo Educational Management and Research Journal, 6*(1), 58–74. https://doi.org/10.30872/bedu.v6i1.5179
Fiantika, F. R., Wasil, M., Jumiyati, S. R. I., Honesti, L., Wahyuni, S. R. I., Mouw, E., Mashudi, I., Hasanah, N. U. R., Maharani, A., Ambarwati, K., Noflidaputri, R., & Waris, L. (n.d.). *Metodologi penelitian kualitatif*.
Husnullail, M., et al. (2024). Teknik pemeriksaan data dalam riset ilmiah. *Genta Mulia, 15*(2), 70–78.
Ilhami, M. W., Nurfajriani, W. V., Mahendra, A., Sirodj, R. A., & Afghani, M. W. (2024). Triangulasi data dalam analisis data kualitatif. *Jurnal Ilmiah Wahana Pendidikan, 10*, 826–833.
Kompas.com. (2025, April 10). *Kinerja sektor tekstil 2025: Pertumbuhan positif di tengah tantangan*. Kompas.com.
Lang, S. (2021). Key factors influencing the maintenance of adult learners' literacy skills levels: A follow-up study of three participant cohorts of the literacy programme in Cambodia. *International Review of Education, 67*(5), 611–636. https://doi.org/10.1007/s11159-021-09913-x
Magri, M., & Ciarletta, P. (2023). Mathematics meets the fashion industry on path to product innovation and sustainability. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 479*(2274). https://doi.org/10.1098/rspa.2022.0715
Muslimawati, N. (2025, April 10). *Investasi industri tekstil capai 304,4 M di Q1 2025, serap 1907 pekerja*. Kumparan.com.
Nasution, A. F. (2023). *Metode penelitian kualitatif* (Cetakan pertama). CV Harva Creative.
Pegurer-Caprino, M. (2016). Media literacy in Brazil: Experiences and models in non-formal education. In *Media literacy in Brazil* (pp. 39–48).
Peraturan Menteri Ketenagakerjaan Republik Indonesia Nomor 6 Tahun 2025. (2025). *Pedoman penyelenggaraan pelatihan vokasi*. Kementerian Ketenagakerjaan Republik Indonesia.
Peraturan Menteri Tenaga Kerja dan Transmigrasi Republik Indonesia Nomor 8 Tahun 2014. (2014). *Pedoman penyelenggaraan pelatihan berbasis kompetensi*. Kementerian Tenaga Kerja dan Transmigrasi Republik Indonesia.
Perkins, K. (n.d.). *Adult literacy and numeracy: Research and future strategy*.
Priang, P. (2023). *Teknik wawancara efektif*. Direktorat Jenderal Bea dan Cukai.
Rahmania, U. G., Safitri, R. R., Putri, A. F., Nurohman, S., & Salehudin, A. (2024). Systematic literature review: How important are literacy and numeracy for students, and how to improve it? *Indonesian Journal of Educational Research and Review, 7*(2), 416–429. https://doi.org/10.23887/ijerr.v7i2.79797
Salsabila, Y., & Fatah, A. (2023). Hubungan antara literasi numerasi terhadap kemampuan berpikir kritis dan kreatif siswa SMP di Kecamatan Curug. *Jurnal Pendidikan, 6*, 42–54.
Sari, N. A. M. Y. (2018). Hubungan antara kemampuan literasi dengan kompetensi inti pengetahuan bahasa Indonesia siswa kelas V SD Gugus Letkol Wisnu Denpasar Utara tahun pelajaran 2017/2018. *Indonesian Journal of Educational Research and Review, 1*(2), 94–103. https://doi.org/10.23887/ijerr.v1i2.14708
Suriani, N., Jailani, M. S., & Penelitian, D. (2023). Konsep populasi dan sampling serta pemilihan partisipan ditinjau. *1*, 24–36.
Susanti, V. D., & Krisdiana, I. (2021). The effect of literacy skills on the critical thinking skills of mathematics education students. *Al-Ishlah: Jurnal Pendidikan, 13*(1), 72–79. https://doi.org/10.35445/alishlah.v13i1.371

Susanto, D., Risnita, & Jailani, M. S. (2023). Teknik pemeriksaan keabsahan data dalam penelitian ilmiah. *Jurnal QOSIM: Jurnal Pendidikan Sosial & Humaniora, 1*(1), 53–61. https://doi.org/10.61104/jq.v1i1.60

Tian, Y., Liu, J., Xu, X., & Wu, X. (2023). Pemetaan pengetahuan kejuruan penelitian pendidikan dan pelatihan (2004–2020): Analisis visual berdasarkan CiteSpace. *1–24.*

Undari Sulung, M. M. (2024). Jurnal Edu Research Indonesian Institute for Corporate Learning and Studies (IICLS) page 25. *Jurnal Edu Research: Indonesian Institute for Corporate Learning and Studies (IICLS), 5*(2), 28–33.

Wong, S.-C. (2020). Competency definitions, development and assessment: A brief review. *International Journal of Academic Research in Progressive Education and Development, 9*(3). https://doi.org/10.6007/IJARPED/v9-i3/8223

Xiao, F., Barnard-Brak, L., Lan, W., & Burley, H. (2019). Examining problem-solving skills in technology-rich environments as related to numeracy and literacy. *International Journal of Lifelong Education, 38*(3), 327–338. https://doi.org/10.1080/02601370.2019.1598507

Yamashita, T., Cummins, P. A., Arbogast, A., & Millar, R. J. (2018). Adult competencies and employment outcomes among older workers in the United States: An analysis of the Program for the International Assessment of Adult Competencies. *Adult Education Quarterly, 68*(3), 235–250. https://doi.org/10.1177/0741713618773496