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Comparing The Effectiveness of Mind Mapping and Summarizing in Enhancing Student Learning Outcomes in Flipped Classroom Model

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Abstract

The urgency of this research lies in the need to explore and compare the effectiveness of two distinct teaching strategies, mind mapping and summarizing, within the flipped classroom model, considering the challenges in determining the most effective method to enhance student learning outcomes across various disciplines, as well as understanding factors that may influence learning success, such as student engagement and material quality. This study examines the effectiveness of the flipped classroom model in enhancing students' learning outcomes, focusing on two distinct instructional strategies: mind mapping and summarizing. Using a posttest-only control group design, the research compared two groups: Class A (mind mapping) and Class B (summarizing), each consisting of 20 fifth-semester chemistry education students. Students engaged with materials independently before class and presented their understanding using their respective methods. Data analysis included descriptive statistics, the Shapiro-Wilk test for normality, Levene's test for homogeneity of variances, and the Mann-Whitney U test for comparing post-test scores. The results showed that Class A followed a normal distribution ($p > 0.05$), whereas Class B did not meet the normality assumption ($p < 0.05$). However, the Levene's test indicated homogeneity of variances between the groups ($p > 0.05$). The Mann-Whitney U test revealed no statistically significant difference in post-test scores ($U = 156.5$, $p = 0.244$), with mean scores of 86.83 for Class A and 86.42 for Class B. Effect size analysis using Cohen's d demonstrated a negligible effect ($d = 0.06$), suggesting equivalent effectiveness between the two methods. These findings highlight that both mind mapping and summarizing are equally effective within the flipped classroom model, reinforcing its versatility in diverse learning contexts. Future research is recommended to explore additional factors, such as student engagement and material quality, that may influence learning outcomes in this instructional model.

Keywords: *Flipped Classroom, Mind Mapping, Summarizing, Learning Outcomes, Instructional Strategies*

Introduction

The contemporary educational landscape, innovative teaching methodologies are increasingly recognized for their potential to enhance student learning outcomes (Man et al., 2020). One such approach that has gained traction is the Flipped Classroom Model, which redefines traditional teaching by allowing students to engage with new content at home and apply their knowledge during in-class activities. Research indicates that this model fosters greater student engagement and improves learning outcomes by promoting active learning and collaborative problem-solving (Ismail, 2022. However, to fully leverage the benefits of the Flipped Classroom, it is essential to explore various pedagogical techniques that can

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complement this model, particularly mind mapping and summarizing writing, both of which have demonstrated efficacy in supporting student learning (Stokhof et al., 2018).

The educational field has increasingly focused on innovative instructional approaches that can engage students more effectively. The Flipped Classroom Model stands out as a particularly relevant pedagogical strategy, reshaping the conventional learning environment (Zhang et al., 2024). This model has been perceived as an effective means of fostering active learning, where students have the opportunity to absorb content at their own pace outside the classroom and then participate in interactive, hands-on activities during in-class time (Pallikadavath et al., 2016). Research has indicated that such approaches enhance student engagement and can lead to improvements in academic achievement through practical application (Chmarkh, 2021). The studies have begun to explore the integration of methods like mind mapping and summarizing writing within the Flipped Classroom framework, analyzing their impacts on students' cognitive and collaborative skills (Belmahdi & Muirhead, 2022)

Mind mapping, a visual representation of information, serves as a powerful tool for organizing thoughts and enhancing cognitive processes (Mekonnen, 2020). Studies have shown that mind mapping can significantly improve students' understanding of complex concepts and their ability to retain information (Wannas et al., 2022). The mind mapping can facilitate collaborative discussions among students, thereby creating a more interactive learning environment (Sinaga & Feronie, 2017). This technique not only aids in the retention of information but also encourages critical thinking and creativity, essential skills in today's educational framework (Noyan & Kocoglu, 2019).

Conversely, summarizing writing is another pedagogical strategy that plays a vital role in education. Crafting summarizings requires students to synthesize and present information systematically, which is crucial for mastering subject matter (Chan et al., 2024). The Flipped Classroom setting, students can be tasked with creating summarizings based on the material they have studied at home, which can then serve as a basis for in-class discussions and activities. Research has indicated that students who engage in summarizing writing often exhibit a deeper understanding of the content (Pina et al., 2023). The comparing the effectiveness of mind mapping and summarizing writing in enhancing student learning outcomes becomes a pertinent inquiry within the Flipped Classroom context (Gopi et al., 2024).

The crucial to consider additional factors that may influence student learning outcomes, such as motivation, engagement, and social support (Adarkwah, 2021). Studies have shown that students who perceive a supportive learning environment tend to achieve better academic results (McKeown et al., 2023). Therefore, this research will also explore how social support and student motivation may interact with the effectiveness of mind mapping and summarizing writing in enhancing learning outcomes.

The novelty of the present research lies in its comparative analysis of mind mapping and summarizing writing, two pedagogical strategies that have shown promise in enhancing student learning but have yet to be evaluated side-by-side within the Flipped Classroom context. While previous studies have documented the individual benefits of these techniques—such as mind mapping enhancing information retention (Zhou et al., 2023). The summarizing writing promoting systematic synthesis of knowledge a direct comparison in a Flipped Classroom setting is lacking (Juul et al., 2023). This gap in the literature highlights the originality of this research endeavor and underscores its significance in understanding how

different instructional strategies may complement each other in a restructured learning environment. The identify not only which method yields greater academic performance, but also how each can tailor student engagement and motivation within the Flipped Classroom Model (Purwanti et al., 2022).

The primary research question guiding this study is: How do mind mapping and summarizing writing compare in their effectiveness to improve student learning outcomes in a Flipped Classroom setting? The study aims to elucidate the strengths and weaknesses of each method by measuring their impacts on student performance and engagement levels. Through this analysis, the research is poised to contribute to educational best practices by offering insights that can help educators optimize their pedagogical approaches in diverse learning contexts. Ultimately, by providing empirical evidence on how these strategies influence key educational outcomes, this research aspires to serve as both a resource for practitioners and a foundation for future studies exploring innovative teaching methodologies.

This study aims to compare the effectiveness of mind mapping and summarizing writing in improving student learning outcomes within the Flipped Classroom Model. Previous research has established that both techniques positively impact learning outcomes; however, there remains a gap in the literature regarding direct comparisons of these methods in a Flipped Classroom setting (Ying & Ayub, 2022). The strengths and weaknesses of each approach, educators can better tailor their instructional strategies to meet the diverse needs of students. Through this investigation, we aim to provide deeper insights into how different learning strategies can be effectively integrated into the Flipped Classroom Model. The findings of this study are expected to contribute to the development of more effective and innovative teaching practices in the future. The comprehensive analysis, we hope to offer practical recommendations for educators seeking to optimize their instructional methods for improved student learning outcomes. Finally, this research aspires to serve as a reference for future studies exploring the relationship between various teaching techniques and student learning outcomes. By doing so, we aim to contribute to the advancement of educational theory and practice, ultimately benefiting students across diverse educational contexts.

Method

The research employed a quantitative comparative approach to compare the effectiveness of two learning methods, mind mapping and summarizing, on students' learning outcomes. The study utilized a Posttest-Only Control Group Design, structured as follows:

Experimental Group A (Mind Mapping): X1 – O

Experimental Group B (Summarizing): X2 - O

X1 represents the treatment using the mind mapping method, X2 indicates the treatment using the summarizing method, and O refers to the post-test administered to measure learning outcomes after the intervention. The population for this study comprised all fifth-semester chemistry education students enrolled in the odd semester of the 2024/2025 academic year. The sample was selected using purposive sampling, ensuring the homogeneity of the students' characteristics. A total of 20 students from Experiment Class A and 20 students from Experiment Class B participated, both employing the flipped classroom learning model. While Class A presented their material analysis using mind mapping, Class B presented it in the form of a summarizing.

Research Instrument

The research instrument was an essay-based post-test designed to assess students' learning outcomes. The test was developed based on a blueprint outlining key competencies aligned with the learning objectives. The test items were constructed to measure students' ability to analyze, synthesize, and apply the learned concepts in different contexts. The test covered three primary cognitive domains:

1. Understanding Concepts – Questions assessing students' comprehension of fundamental theories and principles.
2. Application and Analysis – Items requiring students to apply theoretical knowledge to solve chemistry-related problems.
3. Higher-Order Thinking Skills (HOTS) – Questions prompting students to evaluate and create new connections between concepts, particularly through mind mapping and summarizing strategies.

The validity and reliability of the instrument, expert validation was conducted by three senior lecturers in chemistry education. Content validity was established through expert judgment, ensuring alignment with the intended learning outcomes. Construct validity was assessed through item analysis to determine the clarity, relevance, and difficulty level of each question. The reliability of the post-test was measured using Cronbach's alpha, with a threshold value of ≥ 0.7 considered acceptable for internal consistency. Additionally, a pilot test was conducted with a separate group of students to refine ambiguous items and assess the overall feasibility of the test.

Data Analysis

Data analysis employed descriptive statistics to evaluate the mean, standard deviation, and distribution of post-test scores for both groups. Inferential statistics were also conducted, including the Kolmogorov-Smirnov test to examine data normality, Levene's test to assess variance homogeneity, and an independent t-test or Mann-Whitney U Test to compare the average learning outcomes between the mind mapping and summarizing groups. These analyses aimed to identify significant differences in learning effectiveness between the two methods.

Null Hypothesis (H_0): There is no statistically significant difference in the post-test results between the class using mind mapping (Class A) and the class using summarizing (Class B) in a flipped classroom model.

Alternative Hypothesis (H_a): There is a statistically significant difference in the post-test results between the class using mind mapping (Class A) and the class using summarizing (Class B) in a flipped classroom model.

Results and Discussion

Normality and Homogeneity Tests

The validity of the statistical analysis, normality and homogeneity tests were conducted on the post-test scores of both classes. The Shapiro-Wilk test was employed to assess the normality of the data, while Levene's test was used to determine homogeneity between the two groups. The results of these tests are summarized in the Table 1.

Table 1. *Normality and Homogeneity Tests for Both Classes Based on Post-Test Scores*

No	Test	Class	W-Statistics	p-value	Interpretation
1	Shapiro-Wilk Test (Normality)	Mind Mapping	0.927	0.139	Normal (p > 0.05)
2	Shapiro-Wilk Test (Normality)	Summarizing	0.617	4.47	Not Normal (p < 0.05)
3	Levene's Test (Homogeneity)	Both Classes	1.35	0.25	Homogeneous (p > 0.05)

Comparison Test Between Concept Map Class (A) and Summarizing Class (B)

Table 2 presents the results of the comparative analysis between Class A, which employed mind mapping, and Class B, which created summaries at the beginning of the lecture in the flipped classroom model.

Table 2. *Results of the Comparative Analysis Between Class A and Class B*

No	Test	Statistics	p-value	Interpretation
1	Shapiro-Wilk Test (Normality)	0.927	0.139	Normal (p > 0.05)

Normality and Homogeneity Tests

The results of the normality test using the Shapiro-Wilk method indicated that the post-test scores in Class A (concept map method) followed a normal distribution, with $p > 0.05$ ($W = 0.927$, $p = 0.139$). This finding suggests that the distribution of post-test scores in this class did not significantly deviate from a normal distribution. Conversely, the data for Class B (summarizing method) failed to meet the assumption of normality, with $p < 0.05$ ($W = 0.617$, $p = 0.000004$). The distribution of Class B scores significantly deviated from normality, which could be attributed to greater variability in scores or the presence of specific patterns within the data. Previous research has highlighted that non-normality in data distribution can influence statistical analysis outcomes, emphasizing the importance of conducting normality tests prior to selecting an appropriate analytical method (Tan et al., 2015).

The homogeneity of variances was tested using Levene's test, which showed that the variance of post-test scores between Class A and Class B was homogeneous ($W = 1.353$, $p = 0.252$). With $p > 0.05$, this result indicates that both groups exhibited similar variability in their data, despite the non-normal distribution of scores in Class B. Homogeneity of variances is essential to ensure that comparisons between the two groups can be conducted without significant bias stemming from differences in variability. Previous studies have also emphasized the importance of examining the homogeneity of variances assumption in statistical analyses, as violations of this assumption can compromise the validity of the results (Honea et al., 2017). The conclusion, although Class A displayed a normal distribution and Class B did not, the variances between the two classes were homogeneous. This allows for further statistical analysis, taking into account the data characteristics, such as employing non-parametric tests to address the non-normality in Class B data. These results highlight the importance of understanding data distribution characteristics before selecting an appropriate statistical analysis method. Previous research has also demonstrated that choosing the correct analytical method based on data characteristics can enhance the accuracy and reliability of research findings (Candel 2018).

Comparison of Post-Test Scores Between the Two Classes

The frequency distribution graph (Figure 1) of post-test scores between Class A and Class B reveals distinct patterns in student performance, which may be influenced by differences in instructional strategies. Class A, which utilized the mind mapping technique within the Flipped Classroom Model, exhibited a wider range of scores. The extreme low score around 50 was

observed, while the majority of students scored between 86.26 and 95.33, suggesting that while most students in Class A performed at a relatively high academic level, some students may have struggled with the cognitive demands of constructing mind maps effectively. Research indicates that hands-on instructional strategies, including techniques like mind mapping, may enhance learner engagement but can also introduce variability in performance among students with differing levels of prior knowledge or learning preferences (Rindengan, 2019). The contrast, Class B, which implemented summarizing as part of the Flipped Classroom Model, demonstrated a more consistently distributed score range, with most students scoring between 82 and 89. Summarizing as an instructional strategy might have provided a more structured and accessible approach for a broader range of students, resulting in more consistent achievement across the class, as this strategy is often favored for its clarity and organization in presenting knowledge (Alrenaili et al., 2021).

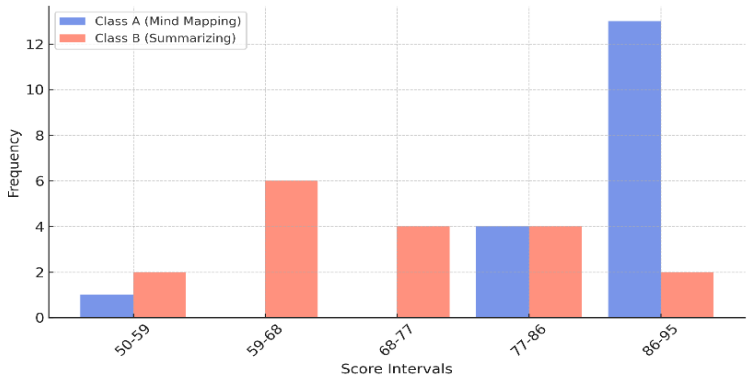

Figure 1. *Comparison of Distribution Post-Test Scores Between Class A and Class B*

The differences in score distributions between the two classes may reflect the cognitive complexity associated with each learning strategy. Mind mapping requires students to organize and connect ideas visually, fostering deeper conceptual understanding but potentially posing challenges for those with weaker prior knowledge or lower proficiency in structuring information (Cho & Kim, 2019). This cognitive load could explain the wider spread of scores in Class A, where some students excelled while others struggled. Conversely, summarizing involves condensing key information into a structured format that is generally easier for students to grasp and apply, likely leading to a more balanced distribution of scores (Dziuban et al., 2018). These differences suggest that the choice of learning strategies within a Flipped Classroom Model significantly impacts the variability in student performance and may be influenced by how well instructional strategies align with students' cognitive capacities (Risavy et al., 2022).

These findings suggest that instructional adjustments could further optimize student learning outcomes. The additional from class A scaffolding and guidance in mind mapping could assist students who struggled to organize information effectively. Providing exemplars or step-by-step frameworks for mind mapping is known to enhance comprehension and reduce performance gaps, aligning with findings that support the efficacy of explicit instructional strategies in bolstering student learning (Ogunjimi & Gbadeyanka, 2022). Meanwhile, for Class B, incorporating elements of conceptual mapping alongside summarization could deepen students' understanding beyond mere factual recall, as seen in studies exploring the interplay between various instructional methods. These insights underscore the importance of aligning chosen learning strategies with students' cognitive capacities to maximize the benefits of the Flipped Classroom Model while ensuring equitable learning outcomes across different instructional approaches (Jama & Alnefaie, 2022).

Comparison Test Between Concept Map Class (A) and Summarizing Class (B)

The comparison of post-test scores was conducted between two classes with different learning approaches, namely the concept map method in Class A and the summarizing method in Class B, within the flipped classroom model. The Shapiro-Wilk normality test indicated that the data in Class A followed a normal distribution ($p > 0.05$), whereas the data in Class B did not meet the normality assumption ($p < 0.05$). However, the Levene's test for homogeneity of variances showed that the variances of the two groups were homogeneous ($p > 0.05$). Consequently, a non-parametric analysis using the Mann-Whitney U test was chosen to examine the differences in post-test scores between the two classes.

The results of the Mann-Whitney U test revealed no statistically significant difference in post-test scores between Class A and Class B ($U = 156.5$, $p = 0.244$). The mean difference in scores between the two classes was minimal, at only 0.42, with the average post-test score of Class A being 86.83 and that of Class B being 86.42. The effect size analysis using Cohen's d demonstrated a very small value of 0.06, indicating that the difference between the two classes was negligible in terms of its practical significance. The summary, both learning methods produced nearly equivalent post-test results in improving students' understanding. This finding suggests that the concept map and summarizing methods are similarly effective within the flipped classroom model.

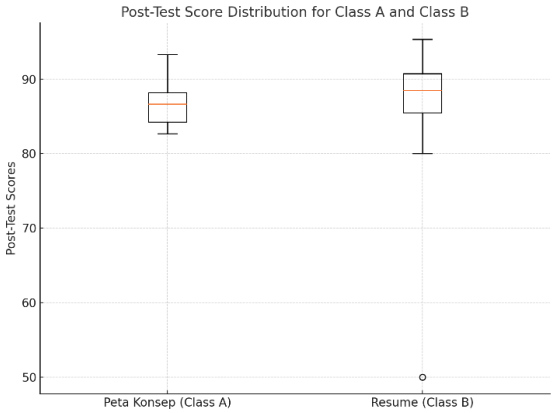

Figure 2. *Comparison of Post-Test Scores Between Class A and Class B*

Based on the results of the Mann-Whitney U test, there was no statistically significant difference in the post-test scores between Class A and Class B, indicating that the two teaching methods, mind mapping and summarizing, have nearly equivalent effectiveness in enhancing students' understanding. These findings align with prior research demonstrating that different instructional methods can yield similar outcomes in the context of a flipped classroom. This is consistent with findings on flipped classrooms, which highlight that this approach enhances student engagement and learning outcomes, regardless of the specific methods employed (Vliet et al., 2015). Another study also shows that students generally prefer the flipped classroom format because it promotes interaction and active engagement during class sessions, ultimately improving material comprehension (Vasylkivska & Rostykus, 2023).

The Another study found that the implementation of flipped classrooms in medical education received positive feedback from both students and faculty, indicating that this method is well-received and effective in enhancing learning outcomes (Kayaalp et al., 2021). Other research supports these findings, showing that flipped classrooms help students self-regulate and direct their learning processes, although the effects may not always be sustained

in the long term (Nhat & Le, 2023). Furthermore, a study demonstrated that the flipped classroom approach improves students' understanding in English language learning, highlighting its effectiveness across various disciplines (Mitra et al., 2023).

Thus, although mind mapping and summarizing employ distinct approaches, the nearly equivalent results in this study suggest that other factors, such as the level of student engagement and the quality of learning materials, may play a more critical role in determining learning success. Future research could further explore these factors and assess the effectiveness of these methods in more diverse learning scenarios.

Conclusion

The implementation of the flipped classroom model allowed students to engage with learning materials independently prior to class and present their understanding using either mind mappingor summaries. This approach aimed to encourage active learning, improve critical thinking, and enhance knowledge retention by enabling students to process information at their own pace before engaging in in-class activities. The findings indicated no statistically significant difference between the post-test scores of Class A (mind mapping) and Class B (summarizing), as demonstrated by the results of the Mann-Whitney U test ($U = 156.5$, $p = 0.244$). Both methods resulted in nearly equivalent learning outcomes, with minimal differences in mean scores. These results suggest that the flipped classroom model effectively supports student learning regardless of the specific method of representation used. However, individual differences, cognitive styles, and prior knowledge may still play a role in determining student performance. Further research is encouraged to examine additional factors, such as student engagement levels, motivation, and the quality of learning materials, that may influence learning outcomes within this model.

Acknowledgment

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References

Adarkwah, M. A. (2021). A Strategic Approach to Onsite Learning in the Era of SARS-Cov-2. In *Sn Computer Science*. https://doi.org/10.1007/s42979-021-00664

Alrehaili, N. A., Aslam, M. A., Alahmadi, D., Alrehaili, D. A., Asif, M., & Malik, M. S. A. (2021). Ontology-Based Smart System to Automate Higher Education Activities. In *Complexity*. https://doi.org/10.1155/2021/5588381

Belmahdi, A., Li, J., & Muirhead, B. (2022). Youth English Language Learners' Learning Outcomes and Experiences of Digital Technology-Based Writing Instruction: A Literature Review of Key Empirical Evidence. *Journal of Digital Life and Learning*, *2*(1), 1–51. https://doi.org/10.51357/jdll.v2i1.166

Candel, M. J. J. M. (2018). Efficient Design of Cluster Randomized Trials With Treatment-dependent Costs and Treatment-dependent Unknown Variances. In *Statistics in Medicine*. https://doi.org/10.1002/sim.7824

Chan, C. K. Y., Kwong, T., Chan, Y. B., Ko, A. W. Y., & Tse, S. S.-K. (2024). What Employers Really Want: A deep Dive Into Résumés and Holistic Competencies. In *Education + Training*. https://doi.org/10.1108/et-06-2023-0252

Chmarkh, M. (2021). 'Writing to Learn' Research: A Synthesis of Empirical Studies (2004-2019). *European Journal of Educational Research*, *volume-10-2021*(volume-10-issue-1-january-2021), 85–96. https://doi.org/10.12973/eu-jer.10.1.85

Cho, M., & Kim, M. Y. (2019). Outcomes and influential factors applying flipped learning methods in a clinical adult nursing practicum. *International Journal of Nursing Practice*, *25*(2). https://doi.org/10.1111/ijn.12724

Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N. (2018). Blended learning: the new normal and emerging technologies. *International Journal of Educational Technology in Higher Education*, *15*(1), 3. https://doi.org/10.1186/s41239-017-0087-5

Gopi Krishna, A. K., Koursar Basha, P., Yadav, S., & Kiran Kumar Reddy, G. (2024). Assessment on recruiters judgements in the summarizings of engineering students in campus recruitment. *Journal of Management Research and Analysis*, *11*(2), 99–108. https://doi.org/10.18231/j.jmra.2024.018

Honea, H., Castro, I. A., & Peter, P. C. (2017). Evidence Items as Signals of Marketing Competencies and Workplace Readiness: A Practitioner Perspective. In *Journal of Marketing Education*. https://doi.org/10.1177/0273475317724845

Ismail, A. (2022). Remote Teaching and Learning During COVID-19 "Lockdown" Period in Malaysia: One Institution's Experience. In *Iium Journal of Orofacial and Health Sciences*. https://doi.org/10.31436/ijohs.v3i1.132

Ismail, A., Ismail, N. H., Kassim, N. Y. M. A., Lestari, W., Ismail, A. F., & Sukotjo, C. (2021). Knowledge, Perceived Risk, and Preventive Behaviors Amidst Covid-19 Pandemic Among Dental Students in Malaysia. In *Dentistry Journal*. https://doi.org/10.3390/dj9120151

Jama, I., & Alnefaie, M. (2022). The Impact of Providing Instructions to EFL Learners by Analyzing their Professional Summarizing. *International Journal of English La nguage and Literature Studies*, *11*(4), 191–201. https://doi.org/10.55493/5019.v11i4.4672

Juul, S. J., Rossetti, S., Kicinski, M., van der Kaaij, M. A., Giusti, F., Meijnders, P., ... & Maraldo, M. V. (2023). Work and education interruption in long-term Hodgkin lymphoma survivors: an analysis among patients from nine EORTC-LYSA trials. *Acta Oncologica*, *62*(7), 744-752. https://doi.org/10.1080/0284186X.2023.2195561

Kayaalp, F., Meral, E., & Başçı Namlı, Z. (2021). I Wrote, I Was Evaluated, And I Learned An Alternative Teaching Process In Distance Education: Writing-To-Learn. *Psycho-Educational Research Reviews*. https://doi.org/10.52963/PERR_Biruni_V10.N3.07

Man, F. L. C., He, H. H., & Cheung, S. K. (2020). Rational Choice, Personal Norms, Social Norms and Intention to Commit Summarizing Fraud. *International Journal of Social Science Research*, *9*(1), 16. https://doi.org/10.5296/ijssr.v9i1.17812

McKeown, J. S., & Bergman-Ray, C. (2023). COVID-19 and US Higher Education: Impact on Student Mobility. In *Creative Education*. https://doi.org/10.4236/ce.2023.144056

Mekonnen, B. D. (2020). Factors Associated With Early Resumption of Sexual Intercourse Among Women During Extended Postpartum Period in Northwest Ethiopia: A Cross Sectional Study. In *Contraception and Reproductive Medicine*. https://doi.org/10.1186/s40834-020-00124-7

Mitra, A. R., Samosir, F. V. P., Hudi, R., & Tarigan, R. E. (2023). From Tradition to Innovation: Mind Map Generation in Higher Education. In *Ultima Infosys Jurnal Ilmu Sistem Informasi*. https://doi.org/10.31937/si.v14i2.3432

Nhat, T. N. M., & Le, T. Van. (2023). Effects of Reflective Thinking On Deep Learning in Theoretical Linguistics Classes. *International Journal of Instruction*, *16*(4), 101–120. https://doi.org/10.29333/iji.2023.1647a

Noyan, E., & Kocoglu, Z. (2019). Developing EFL Writing Skills through WhatsApp Dialogue Journaling. *Advances in Language and Literary Studies*, *10*(2), 38. https://doi.org/10.7575/aiac.alls.v.10n.2p.38

Ogunjimi, M. O., & Gbadeyanka, T. A. (2022). Effect of Guided Inquiry and Explicit-Instructional Strategies on Lower Basic Students' Academic Performance in Mathematics. *Indonesian Journal of Teaching in Science*, *3*(1), 23–32. https://doi.org/10.17509/ijotis.v3i1.54191

Pallikadavath, S., Rajan, S. I., & Wilson, C. (2016). Impact of Low Fertility and Early Age at Sterilisation on Women's Formal Education and Skill Development in South India. In *Journal of Population Research*. https://doi.org/10.1007/s12546-016-9167-y

Pina, A., Petersheim, C., Cherian, J., Lahey, J., Alexander, G. M., & Hammond, T. (2023). Using Machine Learning With Eye-Tracking Data to Predict if a Recruiter Will Approve a Summarizing. In *Machine Learning and Knowledge Extraction*. https://doi.org/10.3390/make5030038

Purwanti, I. T., Suryawati, E., & Eliwarti, E. (2022). Video Lectures in Online EFL Flipped-Classroom: Effectiveness, Students' Evaluation and Experiences. *European Journal of Educational Research*, *volume-11-2022*(volume-11-issue-2-april-2022), 885–898. https://doi.org/10.12973/eu-jer.11.2.885

Rindengan, M. M., & Rindengan, M. (2019, December). Scaffolding Model in Learning of Writing of Essays, Based on Experience. In *5th International Conference on Education and Technology (ICET 2019)* (pp. 220-224). Atlantis Press. https://doi.org/10.2991/icet-19.2019.56

Risavy, S. D., Robie, C., Fisher, P. A., & Rasheed, S. (2022). Summarizings vs. Application Forms: Why the Stubborn Reliance on Summarizings? In *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2022.884205

Sinaga, P., & Feranie, S. (2017). Enhancing Critical Thinking Skills and Writing Skills through the Variation in Non-Traditional Writing Task. *International Journal of Instruction*, *10*(2), 69–84. https://doi.org/10.12973/iji.2017.1025a

Stokhof, H., Vries, B. de, Bastiaens, T., & Martens, R. (2018). Using Mind Maps to Make Student Questioning Effective: Learning Outcomes of a Principle-Based Scenario for Teacher Guidance. In *Research in Science Education*. https://doi.org/10.1007/s11165-017-9686-3

Tan, E., Brainard, A., & Larkin, G. L. (2015). Acceptability of the flipped classroom approach for in-house teaching in emergency medicine. *Emergency Medicine Australasia*, *27*(5), 453–459. https://doi.org/10.1111/1742-6723.12454

Vasylkivska, N., & Rostykus, N. (2023). *The Use of Mind Maps in Primary School*. https://doi.org/10.32782/2415-3605.23.2.4

Vliet, E. A. van, Winnips, J. C., & Brouwer, N. (2015). Flipped-Class Pedagogy Enhances Student Metacognition and Collaborative-Learning Strategies in Higher Education but Effect Does Not Persist. In *Cbe—life Sciences Education*. https://doi.org/10.1187/cbe.14-09-0141

Wannas, A. S., Hassan, I. H., & Mohsen, M. M. A. (2022). Effects of Mind Mapping on Learning ESP Vocabulary: A Case Study. In *Insights Into Language Culture and Communication*. https://doi.org/10.21622/467

Ying, Y. S., & Ayub, A. F. M. (2022). The Impact of Flipped Classroom Instructional Model in Teaching English as a Second Language (ESL) Among Lower Secondary Pupils. In *International Journal of Education*. https://doi.org/10.5296/ije.v14i4.20559

Zhang, F., Wang, H., Zhang, H., & Sun, Q. (2024). The Landscape of Flipped Classroom Research: A Bibliometrics Analysis. In *Frontiers in Education*. https://doi.org/10.3389/feduc.2024.1165547

Zhou, X., Li, W., & Dai, H. (2023). Application of the 3-Step Mind Map Approach in Senior High School English Reading Teaching. In *Journal of Language Teaching and Research*. https://doi.org/10.17507/jltr.1406.34