Metacognitive Based Learning Assisted by Mobile Assisted Language Learning (MALL) to Improve Students' Literacy and Communication Skills in English Language Learning

I Made Tegeh[1], Desak Putu Parmiti[2], Made Aryawan Adijaya[3], G. A. P. Suprianti[4]

Abstract

Currently, English language skills are a very important requirement for students to master, especially students at tourism vocational schools. However, there are still many students who lack English communication skills. The background to this problem underscores the challenges students face in acquiring effective language skills, particularly in a specialized field such as tourism. The urgency of this research addresses the urgent need to improve literacy and communication skills in learning English for Tourism among vocational school students. This research aims to analyze the effect of implementing a metacognitive-based learning model assisted by MALL to improve vocational school students' literacy and communication skills. A total of 171 vocational schools in all districts in Bali were used as the research population. The sample size was determined using the Slovin formula with an error tolerance limit of 3%, this is because the study population is quite large with a variety of variations. Next, sample determination was carried out using a cluster random sampling technique, which aims to select samples in each district spread across rural, suburban and urban areas. The data collection method used in this research is a test. Measuring the achievement of literacy and communication skills is carried out using a combination of tests and questionnaires. This research uses descriptive and inferential quantitative data analysis techniques. Descriptive analysis is used to process data and describe data resulting from dissemination and implementation. Then inferential analysis is used to test the research hypothesis carried out in the implementation process at SMK.

Keywords: *Metacognitive Learning Model, MALL, Critical Thinking Skills, Communication Skills.*

Introduction

Vocational education is a form of education that aims to prepare human resources who are ready to work by mastering skills that are relevant to the world of work (Mahoney et al., 2023; Wongmonta, 2023). Vocational education is related to the social development of the workforce and producing quality workers (Choy & Yeung, 2022; Sudira & Juwanto, 2019). Vocational learning must be able to encourage students to think critically to solve problems, as well as have the ability to communicate and collaborate (Cahuc & Hervelin, 2024; Mudana et al., 2025). Therefore, vocational education must prepare human resources who are ready to work, able to compete in the Industrial Revolution 4.0 era, and have 21st century skills. In addition, students need strong literacy and communication skills to prepare them to enter the workforce. Literacy and communication skills are in accordance with the demands of the 21st century (Bayu et al., 2025; Fikri, 2022; Tegeh et al., 2022).

[1] Universitas Pendidikan Ganesha, Email: im-tegeh@undiksha.ac.id

[2] Universitas Pendidikan Ganesha.

[3] Universitas Pendidikan Ganesha.

[4] Universitas Pendidikan Ganesha.

However, the current problem is that there are still many students who lack the ability to communicate in English. This is reinforced by previous research findings which state that there are still many vocational students who do not master English (Martriwati et al., 2018; Nasution et al., 2021). Other findings state that students have a poor understanding of English due to monotonous learning activities or learning models that are less innovative, so that students find it difficult to understand the learning material (Iskandar et al., 2020; Isnaini et al., 2019; Triana et al., 2021). Learning activities that are less conducive and the lack of supporting learning media have an impact on low student abilities. The results of a survey conducted in 33 tourism vocational high schools (SMK) in Bali show that student involvement/interaction in learning showed a lack of literacy and communication skills of vocational students caused by less innovative learning activities, so that students felt bored in learning English.

In order to develop literacy and communication skills in vocational school children, it is important for teachers to provide learning that is focused on the vocational context or specific field that they are studying (Tegeh et al., 2019; I. W. Widiana et al., 2024). To overcome this problem, the approach that can be used is Metacognitive-Based Learning Assisted by MALL for vocational education. Metacognitive-based learning refers to a learning approach that focuses on helping students develop their metacognitive skills (Tegeh et al., 2021; I. W. Widiana et al., 2020). Metacognition involves thinking about one's thinking processes, understanding how one learns, and being aware of one's cognitive strengths and weaknesses. MALL-Assisted Metacognition-Based Learning involves developing self-awareness, critical thinking, and problem-solving skills, which are essential for effective learning (Darsih & Asikin, 2020; Naderi, 2018). In the context of this research, students are invited to question, evaluate, and reflect on their understanding of English learning materials.

This learning approach when combined with MALL allows students to access information from various sources, encouraging students to think critically. In addition, utilizing mobile technology provides in accordance with the 21st century learning paradigm which provides easy access and flexibility to learning materials anywhere and anytime. Mobile Assisted Language Learning (MALL) is a technology-based learning using smartphone applications (Adijaya et al., 2023; Gharehblagh et al., 2020; Nafa, 2021). MALL has been widely used to improve students' language skills. MALL focuses on the mobility of learning practices and emphasizes interaction between learners and learning content, peers, or instructors and can increase effectiveness, flexibility, and comfort in learning (Irwanto et al., 2019; Kavousi et al., 2019; Ngabekti et al., 2019). Mobile Assisted Language Learning (MALL) is a tool that supports the teaching and learning process during home learning. It helps teachers and students to do learning activities anytime and anywhere without having to go to school and meet other people (Kavousi et al., 2019; Van Der Horst & Albertyn, 2018).

Metacognition in learning can be used in an effort to improve students' ability to learn. This is in accordance with previous research findings which state that the metacognitive approach can improve problem-solving abilities in students (Al-Hamad et al., 2019; Alzieni, 2021). Other studies also state that metacognitive learning involves students' self-understanding of their own thinking processes, so that it can improve students' understanding. The metacognitive approach will be better if combined with technology-based learning such as the use of MALL in learning. MALL has been widely used by educators at elementary, middle, high school and college levels to help the distance learning process. MALL makes the learning process easier (Ramadhani et al., 2020; Rokhmah Wati et al., 2017). improve students' listening skills, especially those who appear to be experiencing decreased motivation, and improve writing skills.

The novelty of this study lies in the development of a metacognitive learning model combined with Mobile Assisted Language Learning (MALL) that is adjusted to students' learning styles, so that students can understand English learning materials very easily. Metacognitive learning assisted by MALL has the potential to improve students' literacy and communication skills in English learning. Previous studies have shown that a metacognitive approach to language learning can increase students' awareness of their learning process, so that they become more independent and able to organize more effective learning strategies. In addition, other studies emphasize the importance of metacognitive strategies in improving listening skills and oral comprehension in second language learning.

Research Method

Design of the Study

This quasi-experimental study used a non-equivalent pretest-posttest control group design (Rogers & Revesz, 2019; Tuckman, 1999). This study focuses on effectiveness testing activities through product implementation. The population of this study was 171 schools in all districts in Bali. The number of samples was determined using the Slovin formula with a tolerance limit of 3% due to the large number of research populations with diverse variations (I Wayan Widiana et al., 2020). Furthermore, sample determination was carried out using the cluster random sampling technique, which aims to select samples in each district spread across rural, suburban and urban areas.

Instruments

The data collection process was carried out by distributing a test consisting of 20 questions containing topics related to housekeeping to vocational high school students to measure literacy and communication skills. Each correct item gets a score of 1, so the maximum score that can be obtained is 20. The grid of the literacy skills test is shown in Table 1.

No	Basic Competency	Cognitive Level	Question Number
1	Understand basic concepts and terms in hotel housekeeping	Explain the meaning of housekeeping and related terms (linen, room status, turn-down service, etc.)	1, 4, 11, 14, 19
2	Understand the duties and responsibilities in housekeeping	Explaining the duties of room attendants and supervisors in maintaining cleanliness and service	2, 3, 12
3	Understand procedures and operational steps in housekeeping	Explains the steps in room cleaning, deep cleaning, and check-out	5, 7, 8, 9, 10, 16
4	Know how to handle guest requests and complaints	Describes the actions taken by housekeeping in response to guest requests and complaints	6, 15, 17, 18
5	Understand the importance of work safety and equipment management	Explaining the importance of personal protective equipment and equipment stock management in housekeeping	13, 20

Table 1. Literacy Ability Test Grid

The instrument used to measure the communication skills of vocational high school students uses an observation instrument containing conversation situations with guests. The topic chosen is material related to "housekeeping". The observation procedure is carried out in several steps: 1.) Students are given a conversation scenario to be practiced. 2.) The observer (teacher/instructor) observes the student's conversation process with guests (simulation) and records their communication behavior based on the rubric above. 3.) The observer gives a score of 1-5 for each aspect according to the student's performance in the scenario. The communication skills observation rubric is shown in Table 2.

Communication Aspect	Description	Score 1	Score 2	Score 3	Score 4	Score 5
Fluency	Students speak fluently without any distracting pauses and can answer quickly.	Frequently stops or stutters.	Lots of pauses, but still understandable.	Some light breaks.	Little pause, smooth communication.	Smoothly without annoying pauses.
Pronunciation	The students' pronunciation is clear and can be easily understood by the guests.	Difficult for guests to understand.	Lots of pronunciation mistakes.	Some errors, but do not interfere with understanding.	Pronunciation is quite clear.	Pronunciation is very clear and precise.
Vocabulary	The use of vocabulary is relevant to housekeeping and the context of the conversation that is taking place.	There are many incorrect words.	Vocabulary is limited and less relevant.	Vocabulary is quite relevant, there are some mistakes.	The vocabulary is quite precise and appropriate.	The vocabulary is very precise and appropriate to the context.
Interaction &	Students' ability to respond	Slow or inappropri	Inappropriate or	The response is quite	Appropriate and natural response.	Very responsive and natural

Communication Aspect	Description	Score 1	Score 2	Score 3	Score 4	Score 5
Responsiveness	appropriately and interact effectively with guests, including using appropriate gestures.	ate response.	unnatural response.	appropriate and natural.		in interacting.
Confidence	Students' confidence in speaking and handling conversation situations in front of guests.	Very insecure.	Lack of confidence, looks nervous.	Quite confident, even though there is a little doubt.	Be confident, even if you're a little nervous.	Very confident and calm.

Table 2. Communication Skills Observation Rubric

Data Analysis

This study uses quantitative data analysis techniques, namely descriptive and inferential analysis. Quantitative data analysis methods are a way of analyzing data in the form of percentages or numbers. Descriptive analysis is used to process data and describe the results of implementation data. Furthermore, inferential analysis is used to test the research hypothesis carried out in the implementation process in elementary schools. The analysis techniques used include descriptive analysis to interpret the results obtained from the questionnaire. Meanwhile, qualitative data is analyzed thematically through the coding and categorization process, which aims to identify the main themes that emerge from the literature review. The results of this analysis are then integrated to provide a comprehensive picture of the problems of English learning that emphasize critical thinking and communication skills.

Results

Pre-test data collection to measure students' initial skills before being given treatment. This pre-test was conducted in several selected elementary schools in Bali Province with the criteria of schools in the middle of the city, suburbs, and outskirts. Some of the target schools are SMK 5 Negara, SMK 2 Singaraja, SMK 1 Mas Ubud, SMK Negeri 1 Tembuku Bangli, SMK PGRI Amlapura, SMK 3 Denpasar.

The data collected from the pre-test and post-test were analyzed using the Multivariate Analysis of Variance (MANOVA) technique with the help of the IBM SPSS Statistics 21.0 program (Bai et al., 2020; Kucuk & Sisman, 2020). This analysis technique was chosen because it is able to test multivariate differences between the variables involved, especially students' literacy and communication skills. With MANOVA, researchers can identify whether there are significant differences in literacy and communication skills between the experimental group using metacognitive-based learning supported by Mobile Assisted Language Learning (MALL) and the control group using conventional teaching methods.

Descriptive Analysis

Based on the results of the descriptive data analysis, it shows a significant increase in both skills, namely speaking and writing after the intervention was carried out. The average post-test for both skills showed a significant difference compared to the pre-test, which means that the metacognitive-based learning treatment supported by Mobile Assisted Language Learning (MALL). In addition, the relatively low standard deviation in the post-test indicates that the increase was evenly distributed among students. More complete is shown in Table 3.

Descriptive Statistics				
	Group	Mean	Std. Deviation	N
Literacy	Pre test	7.6750	1.22762	40
	Post test	8.9500	1.08486	40
	Total	8.3125	1.31778	80
Communication	Pre test	6.7750	1.12061	40
	Post test	8.2000	1.04268	40
	Total	7.4875	1.29257	80

Table 3. Descriptive Analysis Results

Based on Table 3, the results of descriptive statistics show an increase in the average of students' literacy and communication skills between the pre-test and post-test. In literacy skills, the average increased from 7.6750 (SD = 1.22762) in the pre-test to 8.9500 (SD = 1.08486) in the post-test, with an overall average of 8.3125 (SD = 1.31778). In communication skills, the average increased from 6.7750 (SD = 1.12061) in the pre-test to 8.2000 (SD = 1.04268) in the post-test, with an overall average of 7.4875 (SD = 1.29257). These data indicate that the learning intervention carried out was effective in improving students' literacy and communication skills, as seen from the significant difference in the average between the pre-test and post-test

Prerequisite Test

Prerequisite tests are a series of tests conducted before the main statistical analysis in a study. This test aims to ensure that the data used meets certain assumptions required for the results of the statistical analysis to be valid and accurate. Prerequisite tests in this study include normality tests and homogeneity tests. Normality tests are conducted to test whether the data is normally distributed or not, this is important to do before conducting a hypothesis analysis. The results of the normality test are shown in Table 4.

Tests of Normality			
	Class	Kolmogorov-Smirnov[a]	Shapiro-Wilk

		Statistic	df	Sig.	Statistic	df	Sig.
Literacy	Pretest	0.163	20	0.174	0.932	20	0.167
	Posttest	0.144	20	0.200[*]	0.952	20	0.398
Communication	Pretest	0.167	20	0.145	0.911	20	0.066
	Posttest	0.124	20	0.200[*]	0.946	20	0.306
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

Table 4. Normality Test Results

Based on Table 4 shows the results of the normality test using Kolmogorov-Smirnov and Shapiro-Wilk for speaking and writing skills, all pre-test and post-test data show that the data is normally distributed. In speaking skills, the Shapiro-Wilk value shows a p-value of 0.167 for the pre-test and 0.398 for the post-test, both of which are greater than 0.05, so the data is considered normal. Likewise for writing skills, the Shapiro-Wilk p-value is 0.066 for the pre-test and 0.306 for the post-test, which is also greater than 0.05. These results are consistent with the Kolmogorov-Smirnov test, where all p-values are above 0.05, indicating that there is no significant deviation from the normal distribution. Thus, the data meets the normality requirements for further statistical analysis such as MANOVA. Then to check whether the variance between data groups is the same, which is an important assumption in the analysis of variance (ANOVA) for homogeneity results are shown in Table 5.

Levene's Test of Equality of Error Variances[a]				
	F	df1	df2	Sig.
Literacy	0.894	1	78	0.347
Communication	0.474	1	78	0.493
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.				
a. Design: Intercept + Grup				

Table 5. Results of the Homogeneity of Variance Test

Based on Table 5, the results of Levene's Test show that the error variances in both dependent variables, namely literacy and communication, are homogeneous across groups. This is indicated by the significance values for literacy (Sig. = 0.347) and communication (Sig. = 0.493), both of which are greater than the significance level of 0.05. Thus, the null hypothesis stating that the error variance of the dependent variable is the same across groups cannot be rejected. This conclusion indicates that the assumption of homogeneity of variance is met, so that the data meets one of the prerequisites for MANOVA analysis.

Hypothesis Test

MANOVA (Multivariate Analysis of Variance) hypothesis test is a statistical technique used to test the mean differences of several dependent variables simultaneously, based on one or more independent variables or factors. In this context, the experimental group and the control group in two dependent variables, namely literacy and communication skills. The results of the hypothesis test are shown in Table 5.

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	0.987	2901.501[b]	2.000	77.000	0.000
	Wilks' Lambda	0.013	2901.501[b]	2.000	77.000	0.000
	Hotelling's Trace	75.364	2901.501[b]	2.000	77.000	0.000
	Roy's Largest Root	75.364	2901.501[b]	2.000	77.000	0.000
Grup	Pillai's Trace	0.360	21.679[b]	2.000	77.000	0.000
	Wilks' Lambda	0.640	21.679[b]	2.000	77.000	0.000
	Hotelling's Trace	0.563	21.679[b]	2.000	77.000	0.000
	Roy's Largest Root	0.563	21.679[b]	2.000	77.000	0.000
a. Design: Intercept + Grup						
b. Exact statistic						

Table 5. Results of Manova Hypothesis Test

Based on Table 5, the results of the Multivariate Analysis of Variance (MANOVA) test show that there is a significant influence between treatment groups on the dependent variable (literacy and communication skills). This is indicated by the significant value (Sig.) on all multivariate effect sizes, including Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root, all of which are at a significance level of 0.000 ($p < 0.05$). With a Wilks' Lambda value of 0.640 and $F (2, 77) = 21.679$, these results indicate that the model is statistically significant in explaining the differences between groups. The observed effects have quite large strength, as indicated by Pillai's Trace (0.360) and other measures, thus indicating that the treatment contributes substantially to improving students' literacy and communication skills. Then to determine the effect test between subjects, a partial test was carried out as shown in Table 6.

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Literacy	32.513[a]	1	32.513	24.227	0.000
	Communication	40.612[b]	1	40.612	34.668	0.000
Intercept	Literacy	5527.813	1	5527.813	4119.125	0.000
	Communication	4485.012	1	4485.012	3828.520	0.000
Grup	Literacy	32.513	1	32.513	24.227	0.000
	Communication	40.613	1	40.613	34.668	0.000
Error	Literacy	104.675	78	1.342		
	Communication	91.375	78	1.171		
Total	Literacy	5665.000	80			
	Communication	4617.000	80			
Corrected Total	Literacy	137.188	79			
	Communication	131.988	79			
a. R Squared = .237 (Adjusted R Squared = .227)						
b. R Squared = .308 (Adjusted R Squared = .299)						

Table 6. Partial Test Results

Based on Table 6, the results of the partial test through the Tests of Between-Subjects Effects show that there is a significant effect of treatment on students' literacy and communication skills.

This is evidenced by the high F value and Sig. value of 0.000 for both dependent variables, which is below the significance threshold of 0.05. Specifically, the F value for literacy is 24.227 with an R Squared of 0.237, indicating that the treatment explains 23.7% of the variability in literacy scores. Meanwhile, the F value for communication is 34.668 with an R Squared of 0.308, indicating that the treatment explains 30.8% of the variability in communication scores. Thus, the treatment given is statistically proven to have a significant effect on improving both abilities, indicating the effectiveness of the applied learning method.

The results of the MANOVA analysis showed that there was a significant increase in students' speaking and writing skills in the experimental group compared to the control group. This increase reflects the effectiveness of using MALL in supporting metacognitive-based learning, which specifically helps students develop their communication skills. Students in the experimental group showed better development in speaking and writing, compared to students in the control group who only used traditional teaching methods.

Discussion

The results of the study showed that the use of Mobile Assisted Language Learning (MALL) in metacognitive-based learning significantly improved students' speaking and writing skills. MANOVA analysis confirmed that students in the experimental group showed better development than the control group, especially in the aspect of English communication. This shows that the integration of MALL with strategies metacognition can provide a more interactive, adaptive learning experience and support independent learning (Asmawati et al., 2019; Ramadhani et al., 2020). Speaking skills improve as students have the opportunity to practice through interactive simulations or audio recordings that allow for reflection. Meanwhile, writing skills are honed through features such as writing prompts or digital collaboration that provide instant feedback.

These results are in line with previous research which confirms that MALL can improve language skills because it provides flexibility in learning in various contexts (Adijaya et al., 2023). In addition, other studies have found that the use of mobile technology can increase students' learning motivation and provide space for more frequent and effective practice (Yusuf, 2022). Metacognitive strategies, as suggested by other studies, provide a framework for students to understand and regulate their learning process, which is particularly relevant in the development of literacy and communication skills (Fatmawati & Safitri, 2020; Hanik, 2020). The combination of these two approaches is an innovation that is able to answer the challenges in learning English today.

This study has important implications for the development of English language learning models in the digital era. The integration of MALL with metacognitive-based learning not only helps students develop communication skills but also improves their ability to learn independently. This suggests that teachers need to be more adaptive in utilizing technology as an integral part of learning strategies. In addition, these findings can encourage policy makers to consider procuring mobile devices and learning applications to support this method, especially in schools with adequate resources.

Although the results of the study show the effectiveness of MALL, there are several limitations that need to be considered. First, this study only involved a limited sample in a specific context, so generalizing the results to a wider population requires caution. Second, the duration of the intervention was relatively short, so it cannot yet describe the long-term impact of this method.

In addition, technical limitations such as the availability of mobile devices and stable internet connections in all locations are also challenges that need to be overcome for wider implementation. Further research with a wider scope and longer duration is highly recommended to validate these findings.

Conclusion

This study proves that the integration of Mobile Assisted Language Learning (MALL) with metacognitive-based learning significantly improves students' speaking and writing skills compared to traditional teaching methods. This finding is supported by previous studies that highlight the effectiveness of mobile technology in language learning, especially in increasing students' motivation and engagement. The implications of this study indicate the need for the development of technology-based adaptive learning models to support students' communication skills and self-regulated learning. However, limitations such as short intervention duration, limited sample size, and technical challenges indicate the need for further research with a more comprehensive design for further validation.

References

Adijaya, M. A., Armawan, I. K., & Kristiantari, M. G. R. (2023). Mobile-Assisted Language Learning (MALL) Innovation for Vocational Education. ,. International Journal of Language Education, 7(3), 469–480. https://eric.ed.gov/?id=EJ1409200

Al-Hamad, R. F., Al-Jamal, D. A. H., & Bataineh, R. F. (2019). The effect of mall instruction on teens' writing performance. Educ. Rev Digit, 35(289–298). https://doi.org/10.1344/DER.2019.35.289-298.

Alzieni, H. (2021). The Impact of Mobile-Assisted Language Learning (MALL) in Developing the Listening Skill: A Case of Students at Dubai Men's College, the United Arab Emirates. Arab World English Journal, 2(2). https://doi.org/10.24093/awej/mec2.6

Asmawati, A., Risnawati, R., & Muhandaz, R. (2019). Pengaruh Penerapan Strategi Pembelajaran Metakognitif terhadap Kemampuan Koneksi Matematis Berdasarkan Kemandirian Belajar Siswa SMP/MTs. JURING (Journal for Research in Mathematics Learning), 2(3), 273. https://doi.org/10.24014/juring.v2i3.7813

Bai, B., Shen, B., & Mei, H. (2020). Hong Kong primary students' self-regulated writing strategy use: Influences of gender, writing proficiency, and grade level. Studies in Educational Evaluation, 65(August 2019). https://doi.org/10.1016/j.stueduc.2020.100839

Bayu, G. W., Yudiana, K., Suniasih, N. W., Abadi, I. B. G. S., Dewantara, K. A. K., & Antara, I. G. W. S. (2025). The Effect of SMART-Based Goal Free Evaluation Approach on Students' Analytical Skills and Self-Reflection. Journal of Posthumanism, 5(3), 692–702. https://doi.org/10.63332/joph.v5i3.779

Cahuc, P., & Hervelin, J. (2024). The effect of workplace vs school-based vocational education on youth unemployment: Evidence from France. European Economic Review, 162. https://doi.org/10.1016/j.euroecorev.2023.104637

Choy, M. W., & Yeung, A. S. (2022). Cognitive and Affective Academic Self-Concepts: Which Predicts Vocational Education Students' Career Choice? International Journal of Educational Research Open, 3, 100123. https://doi.org/10.1016/j.ijedro.2022.100123

Darsih, E., & Asikin, N. A. (2020). Mobile Assisted Language Learning: Efl Learners' Perceptions Toward the Use of Mobile Applications in Learning English. Journal of English Education, 8(2). https://doi.org/10.25134/erjee.v8i2.2999

Fatmawati, E., & Safitri, E. (2020). Kemampuan Literasi Informasi Dan Teknologi Mahasiswa Calon Guru Menghadapi Pembelajaran Di Era Revolusi Industri 4.0. Edukasi: Jurnal Pendidikan, 18(2), 214. https://doi.org/10.31571/edukasi.v18i2.1863

Fikri, M. & T. I. . (2022). The Impact Of Social Skills Training On The Ability To Cooperate In Early Childhood. Indonesian Values And Character Education Journal, 1(5), 32–41. https://doi.org/10.23887/ivcej.v5i1.44227

Gharehblagh, Mahi, N., & Nasri, N. (2020). Developing EFL elementary learners' writing skills through mobile-assisted language learning (MALL). Teach. English with Technol, 20(1).

Hanik, E. U. (2020). Self Directed Learning Berbasis Literasi Digital Pada Masa Pandemi Covid-19 di Madrasah Ibtidaiyah. Elementary: Islamic Teacher Journal, 8(1), 183–208. https://doi.org/10.21043/elementary.v8i1.7417

Irwanto, Taufik, Hernawan, & Rizal. (2019). Efektivitas Multimedia Interaktif Dan Mobile Learning Dalam Meningkatkan Hasil Belajar Siswa Pada Mata Pelajaran Seni Budaya. Jurnal Pendidikan Dan Kajian Seni, 4(1). https://doi.org/10.30870/jpks.v4i1.6845.

Iskandar, N., Mustaji, & Jannah, M. (2020). Development of student worksheets as online english learning media at the Indonesian vocational school. International Journal of Engineering Research and Technology, 13. https://doi.org/10.37624/IJERT/13.11.2020.3819-3824

Isnaini, F., Setyono, B., & Ariyanto, S. (2019). A visual semiotic analysis of multicultural values in an Indonesian English textbook. Indonesian Journal of Applied Linguistics, 8(3), 545–553. https://doi.org/10.17509/ijal.v8i3.15253

Kavousi, S., Miller, P. A., & Alexander, P. A. (2019). Modeling metacognition in design thinking and design making. International Journal of Technology and Design Education, 30(1), 1–27. https://doi.org/10.1007/s10798-019-09521-9

Kucuk, S., & Sisman, B. (2020). Students' attitudes towards robotics and STEM: Differences based on gender and robotics experience. International Journal of Child-Computer Interaction, 23–24(June 2020), 100167.1-8. https://doi.org/10.1016/j.ijcci.2020.100167

Mahoney, B. B., Oostdam, R. R., Nieuwelink, H. H., & Schuitema, J. J. (2023). Learning to think critically through Socratic dialogue: Evaluating a series of lessons designed for secondary vocational education. Thinking Skills and Creativity, 50. https://doi.org/10.1016/j.tsc.2023.101422

Martriwati, M., Setyani, R. S., Sari, H. N., & Kaniadewi, N. (2018). Pelatihan Penggunaan Bahasa Kelas (Classroom Language) Dalam Pembelajaran Bahasa Inggris Bagi Guru SMK Jakarta Pusat 1 Jakarta. Jurnal SOLMA, 7(1), 1. https://doi.org/10.29405/solma.v7i1.645

Mudana, I. W., Widiana, I. W., & Kurniawan, M. F. (2025). Internalization of Ngaben ceremony values in history learning to enhance students' cultural literacy and social attitudes. Cakrawala Pendidikan, 44(1). https://doi.org/10.21831/cp.v44i1.59155

Naderi, S. (2018). EFL learners' reading comprehension development through MALL: Telegram groups in focus. International Journal of Instruction, 11(2), 339–350. https://doi.org/10.12973/iji.2018.11223a

Nafa, A. H. (2021). The Use of Mobile Assisted Language Learning in English of Forth Semester engglish Departement student at IAIN Smarinda", Use Mob. Assist. Lang. Learn. J. Tarb. Ilmu Kegur. Borneo, vol 2, no 1, bll 23–34, 2020. Jurnal Tarbiyah Dan Ilmu Keguruan Borneo, 2(1). https://doi.org/10.21093/jtikborneo.v2i1.3162

Nasution, A., Siddik, M., & Manurung, N. (2021). Efektivitas Mobile Learning Dalam Pembelajaran Bahasa Inggris Pada Sekolah Menengah Kejuruan. Journal of Science and Social Research, 4(1). https://doi.org/10.54314/jssr.v4i1.470

Ngabekti, S., Prasetyo, A. P. B., Hardianti, R. D., & Teampanpong, J. (2019). The development of stem mobile learning package ecosystem. Jurnal Pendidikan IPA Indonesia, 8(1), 81–88. https://doi.org/10.15294/jpii.v8i1.16905

Ramadhani, M. H., Caswita, C., & Haenilah, E. Y. (2020). Efektivitas Model Problem Based Learning Bersasis Metakognitif Terhadap Kemampuan Berpikir Kritis Matematis. Jurnal Cendekia : Jurnal

Pendidikan Matematika, 4(2), 1064–1071. https://doi.org/10.31004/cendekia.v4i2.323

Rogers, J., & Revesz, A. (2019). Experimental and quasi-experimental designs. Https://Www.Researchgate.Net/Publication/334250281, 113.

Rokhmah Wati, D. A., Tukiran, T., & Ibrahim, M. (2017). Penerapan Magang Kognitif (Cognitive Apprenticeship) Untuk Mengajarkan Keterampilan Metakognitif Dan Hasil Belajar Kognitif Siswa. JPPS (Jurnal Penelitian Pendidikan Sains), 2(2), 212. https://doi.org/10.26740/jpps.v2n2.p212-217

Sudira, P., & Juwanto, R. E. (2019). Design training kits CPI for vocational learning in industry 4.0. International Journal of Recent Technology and Engineering, 8(3), 6293–6302. https://doi.org/10.35940/ijrte.C5917.098319

Tegeh, I. M., Astawan, I. G., Sudiana, I. K., & Kristiantari, M. G. R. (2021). Murder Learning Model Assisted By Metacognitive Scaffolding To Improve Students' Scientific Literacy and Numeracy Skills Through Science Studies in Elementary Schools. ,. Jurnal Pendidikan IPA Indonesia, 10(4), 618–626. https://doi.org/10.15294/jpii.v10i4.32926

Tegeh, I. M., Mahadewi, L. P. P., Agung, A. A. G., & Suwatra, I. I. W. (2019). The Effectiveness of Innovative Students' Assignment Plans Based on Tri Hita Karana in Blended Learning Setting. In 2019 5th International Conference on Education and Technology (ICET), 1–6.

Tegeh, I. M., Santyasa, I. W., Agustini, K., Santyadiputra, G. S., & Juniantari, M. (2022). Group Investigation Flipped Learning in Achieving of Students' Critical and Creative Thinking Viewed from Their Cognitive Engagement in Learning Physics. Journal of Education Technology, 6(2), 350–362. https://doi.org/10.23887/jet.v6i2.44417

Triana, M., Herman, H., Sinurat, B., & Silalahi, D. E. (2021). An Analysis of Students Perception on the Use of Google Classroom in English Language Learning. Cetta: Jurnal Ilmu Pendidikan, 4(3), 607–618. https://doi.org/10.37329/cetta.v4i3.1474

Tuckman, B. W. (1999). Conducting educational research (5th ed.). Orlando: Harcourt Brace College Publisher.

Van Der Horst, C. A., & Albertyn, R. M. (2018). The importance of metacognition and the experiential learning process within a cultural intelligence–based approach to cross-cultural coaching. SA Journal of Human Resource Management, 16(1), 1–11. https://doi.org/10.4102/sajhrm.v16i0.951

Widiana, I. W., Parwata, I. G. L. A., Jampel, I. N., & Tegeh, I. M. (2024). The needs of a metacognitive-based learning model in elementary schools. Nurture, 18(2), 394–403.

Widiana, I. W., Tegeh, I. M., & Parwata, I. G. L. A. (2020). Improving student's factual knowledge with concrete media through observing activities in scientific approaches in elementary schools. Journal of Education and E-Learning Research, 7(3), 293–299. https://doi.org/10.20448/journal.509.2020.73.293.299

Widiana, I Wayan, Gading, I. K., Tegeh, I. M., & Antara, P. A. (2020). Validasi Penyusunan Instrumen Penelitian Pendidikan (S. Nurachma (ed.)). PT Raja Grafindo Persada.

Wongmonta, S. (2023). Revisiting the wage effects of vocational education and training (VET) over the life cycle: The case of Thailand. International Journal of Educational Development, 103. https://doi.org/10.1016/j.ijedudev.2023.102886

Yusuf, H. O. (2022). Impact Of Teachers Use Of Folktales On The Performance Of Pupils In Reading Comprehension. European Journal of Education Studies, 4, 107–120. https://doi.org/10.46827/ejes.v0i0.353.