

## INTERACTIVE E-MODULES ASSISTED BY GOOGLE SITES IN EFL: ITS EFFECT ON STUDENTS' CRITICAL THINKING AND LEARNING ENGAGEMENT

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**Abstract.** This study explores how interactive e-modules utilizing Google Sites affect high school students' critical thinking and involvement in EFL classrooms. Using a mixed-methods approach, it compares an experimental group utilizing e-modules to a control group that uses textbooks. The results revealed considerable gains in critical thinking and engagement in the experimental group. Qualitative evidence showed that these students were more engaged and collaborative. The study indicates that interactive e-modules may assist in creating a more dynamic learning environment, and it recommends integrating them into teaching techniques and investing in appropriate technology. Future studies ought to investigate the long-term impacts of these instruments.

### INTRODUCTION

The rapid development of technology has dramatically influenced Indonesia's educational system, particularly with the implementation of the Kurikulum Merdeka. This curriculum encourages Student-centred learning by allowing students to determine what they prefer to study inside and outside of the classroom (Budiwati et al., 2022; Kemendikbudristekdikti, 2022; Pertiwi et al., 2022). As a result, teachers must devise novel ways to promote critical thinking and learning engagement, both essential 21st-century abilities (Purnadewi & Widana, 2023). Critical thinking has become more important in English as a Foreign Language (EFL) lessons, especially for improving reading and writing abilities (Sèna & Etienne, 2022). However, conventional teaching methods frequently fail to engage students and enhance their critical thinking skills (Khalifatussalam, 2021). This problem highlights the necessity for innovation. This issue emphasizes the need for creative instructional approaches that encourage critical thinking and student participation.

Technology in education offers an acceptable alternative, with interactive e-modules emerging as useful tools (Sumandya et al., 2022). E-modules, particularly those facilitated by Google Sites, provide organized and interactive learning experiences accessible at all times

and from anywhere, thus boosting student autonomy and participation (Munir et al., 2023; Diansah & Asyhari, 2020; Sukendra et al., 2023). According to research, Google Sites-based instructional materials can improve students' comprehension and critical thinking skills (Sevtia et al., 2022). Despite these advances, limited investigation exists on the effects of interactive e-modules on critical thinking and student engagement in high school EFL classrooms. This study intends to solve this gap by exploring how interactive e-modules facilitated by Google Sites improve high school students' critical thinking and learning engagement. The research aims to give insights into enhancing a more dynamic and effective learning environment in EFL classrooms, which aligns with the Kurikulum Merdeka objectives.

This study used a mixed-methods experimental design to investigate the influence of interactive e-modules powered by Google Sites on high school students' critical thinking and participation in EFL classrooms. The primary technique is quantitative, with support from qualitative data. According to Creswell (2018), this design integrates qualitative data into investigations to supplement the primary quantitative data. The study aims to determine how these e-modules affect students' critical thinking and engagement. It consists of two groups: an experimental group that utilizes interactive e-modules and a control group that uses standard textbooks. The participants were 11th-grade students from SMA Negeri 2 Kuta, chosen after preliminary searches and interviews with teachers and administrators. Pre- and post-tests were used to assess critical thinking skills and engagement, and surveys, research notes, and observations were used to provide qualitative insights. The control group received the same teaching content but through conventional methods. The purpose was to determine if interactive e-modules resulted in better critical thinking and engagement than the conventional method.

From the ideas mentioned above, three research problems are proposed in this study: (1) Is there any significant effect of using interactive e-modules assisted by Google Sites on Students' critical thinking skills? (2) Is there any significant effect of using interactive e-modules assisted by Google Sites on Students' critical thinking skills and learning engagement in EFL classes? (3) is there any simultaneous effect of using interactive e-modules assisted by Google Sites on students' critical thinking and learning engagement in EFL classes? Due to the problems mentioned earlier, research goals can be split into general and specific goals. Here is how they can be stated: (1) This study examines how using an interactive e-module created with Google Sites impacts high school students' critical thinking skills and learning engagement in EFL classes, how using interactive online materials made with Google Sites affects high school student's interest in learning English; (2) This study examines how interactive online modules with Google Sites affect high school students' critical thinking skills and involvement in learning English as a Foreign Language (EFL) classes.

The researchers hope that their findings can support earlier ideas. This study helps improve English language teaching. It focuses on using interactive online modules through Google Sites to help students think critically and get more involved in their learning. The results of this research should be helpful for English teachers, students, and future researchers. It helps teachers better understand new ways and tools for teaching and learning and how important creative and innovative tools are in teaching. The goal is to improve critical thinking skills and keep high school students more engaged in their English as a Foreign Language (EFL) classes, help students learn better with the Kurikulum Merdeka, and give them more chances to choose how they learn. This will help them improve their critical thinking skills, essential

for dealing with the challenges of the 21st century (Widana & Laksitasari, 2023). Also, it is hoped that this can help students get more involved in their learning and succeed in learning English as a foreign language. For Researchers in the Future, this can help others doing similar research understand more about using student-centered learning in Kurikulum Merdeka. It examines how interactive e-modules with Google Sites can improve students' critical thinking skills and learning engagement.

### **E-Modules Assisted by Technology and Critical Thinking**

This study expands on prior research investigating the relationship between technology-enhanced learning settings and critical thinking abilities. Substantial empirical research suggests that e-modules, particularly those enabled by platforms such as Google Sites, have great potential for improving students' critical thinking abilities. Prior research has shown that e-modules can help students build critical thinking skills through interactive elements and tailored learning paths. According to Hung et al. (2020) adding simulations, case studies, and open-ended questions into e-modules deepens student engagement with the topic and promotes analytical thinking. Furthermore, Hidayat et al. (2023), noted that Google Sites' collaborative capabilities encourage peer learning and constructive conversation, strengthening students' critical viewpoints.

Hidayat et al. (2023), reinforce the relationship between e-modules and Google Sites by demonstrating how multimedia resources and interactive components boost students' knowledge of complicated subjects. Notably, Zulfanida Ernest et al. (2023), demonstrated the enormous benefits of employing e-modules assisted by Google Sites in history lessons, with students showing significant gains in critical thinking abilities compared to conventional methods. E-modules facilitated by Google Sites are a potential technique for improving students' critical thinking skills. Interactive features, collaborative tools, and personalized learning can inspire students to actively investigate, evaluate, and discuss, resulting in a more profound comprehension and reasoned conclusions. More studies are needed to assess the long-term benefits of these tactics for developing critical thinking and their usefulness across various subjects.

By integrating their study with these significant findings, the researchers want to add to the expanding literature on technology-mediated education and its influence on critical thinking development. The study's thorough empirical examination aims to discover the particular ways that interactive e-modules supported by Google Sites effect students' cognitive processes and reasoning abilities. This research aims to enlighten educators and policymakers about the transformational potential of novel learning technologies in improving critical thinking skills among 21st-century learners.

### **Interactive E-Modules and Learning Engagement**

This study adds to a large body of work highlighting the critical significance of technology-enhanced learning settings in increasing student engagement. Previous research has repeatedly demonstrated that e-modules, particularly with platforms like Google Sites, offer novel approaches to encourage active involvement and ongoing interest in learning. Zakiyah & Dwiningsih, (2022), point out that including interactive components in e-modules attracts students' attention and keeps them engaged throughout the learning process. Using quizzes, gamification, and simulations in e-modules allows for dynamic interactions that boost student engagement and improve learning results. Pertiwi & Purnawarman (2023) Further, individualized learning routes inside e-modules allow students to take control of their

learning journey, instilling a feeling of autonomy and investment in their education. Google Sites' collaborative capabilities improve the learning experience by fostering student community and information exchange. According to [Nabilah et al. \(2023\)](#) forums, chats, and online polls enhance active involvement and peer interaction, resulting in a supportive learning environment that promotes collaborative learning. She emphasizes that Google Sites' real-time feedback systems allow students to receive tailored instruction and measure their progress, supporting their dedication to the learning process. [Sagita et al., \(2023\)](#), discovered that combining e-modules with Google Sites dramatically boosted student participation in scientific tasks. Google Sites' collaborative features enabled students to share ideas, publish research findings, and get peer reviews, building a feeling of academic community and increasing their incentive to study.

## **METHOD**

This research study uses a mixed-approaches experimental strategy, especially the concurrent embedded design, with quantitative methods as the major emphasis and qualitative methods providing extra assistance. It looks at the effect of interactive e-modules provided by Google Sites on strengthening critical thinking abilities and learner engagement among senior high school students enrolled in English as a Foreign Language (EFL) programs. The study involves two groups: an experimental group and a control group. Due to the difficulties in identifying a control group in educational contexts, a quasi-experimental design is utilized, which allows for a control group with limited control over external factors. The investigation was carried out at SMA Negeri 2 Kuta, located on Jalan Pura Dalem Kedonganan in the Kuta District of Badung Regency. This school was chosen because it conducts Stage F lessons based on student's interests and skills, such as advanced English language studies and informatics subjects, aligning with the research aims.

Data collection began after receiving consent from the school administration and aligning with the English language learning schedule for the second semester of the 2023/2024 academic year to ensure maximum engagement and the least disturbance. The study population comprises all students enrolled at SMA Negeri 2 Kuta during the 2023/2024 academic year, especially those in Phase F of the Kurikulum Merdeka implementation. This includes nine classes (XI F1 to XI F9) with 27 to 36 students each. The school used Impact Group Sampling to select two classes (XI F7 and XI F9) for the research. Class XI F9 was randomly allocated as the experimental class, whereas XI F7 was designated as the control class. The researcher approached the sample classes to get permission to conduct the investigation. The experimental class utilizes interactive e-modules with Google Sites, whereas the control class relies on conventional textbooks. The dependent variables include critical thinking and student learning engagement. Pretest and posttest data are used to assess critical thinking abilities, and learner engagement is quantified using an engagement scale survey based on [Burch's \(2015\)](#) methodology. Controlled variables include textbooks, lesson materials, and study time. Both groups were taught by the same teacher, with the same materials and the same study time (5 hours each week).

## **RESULTS AND DISCUSSION**

The research was conducted at SMA Negeri 2 Kuta. The experimental classes (XI F7) and the control classes (XI F9) served as samples. The sample size was 54, with 27 students in each class. The first step in this study is to provide a pretest to both the experimental and control groups to assess students' fundamental competencies before the intervention. The experimental and control courses were pre-tested on May 6, 2024. The pre-test, which

includes 18 questions modified from Facione (2011), assesses students' critical thinking skills. Even though each class received a distinct intervention during the learning process, experimental and control courses received a comparable pre-test using Google Forms.

The experimental class (XI F7) was conducted using an interactive e-module assisted by Google Sites in 6 meetings, including two meetings per week (each meeting is two 45-minute sessions), with the learning tasks distributed as follows: Meetings 1 and 2 comprised a pre-test and an exposure to the next topics. The exposition text is studied using an interactive e-module and Google Sites, followed by learning activities 1 and 2 at the third and fourth meetings, and evaluations, remedial, enrichment, and post-tests on the exposition text are administered at the fifth and sixth meetings, respectively.

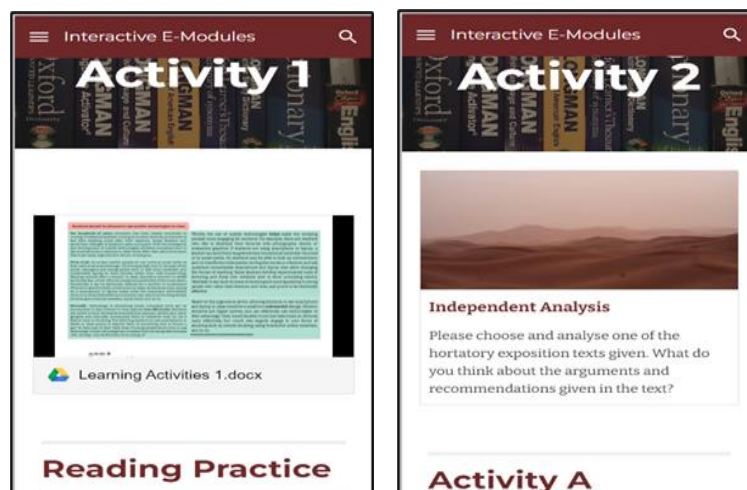
The use of an interactive e-module, helped by Google Sites, is designed to help students absorb expository texts in a more engaging and participatory manner. The main characteristics of the interactive e-module are: (1) Exposition text was presented using multiple modalities (text, audio, and video). (2) Interactive activities include quizzes, padlets, group conversations, and discussion boards. (3) Automatic Feedback: Students receive immediate feedback on their responses.



**Image 1.** Interactive E-module assisted by Google Sites

The interactive e-module used in this study was divided into Learning Activity 1 and Learning Activity 2. Each part contains various interactive activities meant to measure students' critical thinking abilities on platforms such as Padlet and Quizizz. Before participating in these activities, students explained the exposition text via YouTube.

In Learning Activity 1, students are given a worksheet on Google Docs. This worksheet promotes group discussion and cooperation in a single document while critically examining an expository text's structure and grammar. In Learning Activity 2, students engage in interactive activities to improve their critical thinking skills, such as Padlet conversations and Quizizz in Reading comprehension tasks. The arrangement of Learning Activities 1 and 2 in the interactive



**Image 2.** Learning activities 1 and 2 through Interactive E-module assisted by Google Sites

During this stage, the researcher observes and records student activities and interactions throughout the learning process. Students who actively participate in discussions and presentations of their discoveries in front of the class, actively respond to the quiz and comment on other group worksheets demonstrate success in this exercise. They can also demonstrate their involvement in class activities or outside of class using interactive e-modules facilitated by Google Sites.

This level differs slightly from the control class (XI F9), in which learning materials and activities are delivered using conventional textbook methods. Even though the material offered is comparable, the procedures and activities are only those defined in the textbook, and students only engage during classroom learning activities. This study employed two strategies to assess and improve students' critical thinking skills and learning engagement: an interactive e-module assisted by Google Sites for the experimental class and conventional textbook-based methods for the control class. The research notes provide detailed observations of the student's activities and interactions during the learning process. The findings show that the interactive e-module, assisted by Google Sites, greatly improved students' critical thinking abilities and learning engagement compared to the conventional method using a textbook. The digital platform increased chances for interaction, collaboration, and continuous engagement, resulting in a more comprehensive learning experience for students in the experimental class.

After a series of learning activities, ranging from spreading comprehension to assessment and reflection in the experimental and control classrooms, a post-test was administered to assess the progress in their critical thinking abilities. Aside from taking the post-test, students complete a learning engagement survey adapted from Burch (2015) to assess their engagement development based on four things in questions, which include emotional, physical, and cognitive involvement in and outside of class. The obtained data, including pre-test, post-test, and survey findings, was then analyzed statistically with SPSS 23. By aligning this research with these major results, the study hopes to add to the continuing debate on technology-mediated pedagogy and its influence on student engagement. The study aims to discover how interactive e-modules, powered by Google Sites, affect students' engagement and involvement in learning through rigorous empirical examination. By broadening the conversation on the subject, this research intends to teach educators about the

transformative potential of novel learning technologies in fostering student engagement and academic performance.

The following section of this article presents quantitative and qualitative data findings. After the treatments were implemented in the experimental group, data on critical thinking and learning engagement were collected from both experimental and control groups. Before proceeding with data analysis, the present data refers to dispersion data. Data dispersion has many essential functions in statistics and data analysis. According to John Tukey (1961), data dispersion refers to how much data deviates from the average or median. This is important in assessing whether the data is consistent. The table below shows the statistical distribution of pretest data for the experimental and control classes.

**Table 1.** Dispersion data Pre-test experimental class and Control class

Data Dispersion	Mean	Std. Error	Median	Mode	Std. Dev	Sample Variance	Range	Min.	Max.	Count
Pre-test in Experimental Class	57.00	2.34	57.41	70.37	12.14	147.29	44.44	29.63	74.07	27
Pre-test in Control Class	66.19	1.57	68.52	68.52	8.18	66.90	31.48	42.59	74.07	27

The findings showed that: (1) The experimental class had a greater range of values than the control class, with a range of 44.44 vs 31.48. (2) The sample variance in the experimental class is 147.29, but in the control class, it is 66.90, indicating that the score distribution in this class is more diversified. (3) The experimental class had a higher standard deviation (12.14) than the control class (8.18), indicating more variability in the pre-test findings. The statistics above show that the experimental class has a broader range of data and a bigger variance in values than the control class.

The pre-test and post-test results for critical thinking skills were examined using a critical thinking test based on hortatory exposition text and provided through Google Forms. These were analyzed for the experimental class that used interactive e-modules assisted by Google Sites. The pre-test and post-test had 18 questions and were given to the experimental and control groups. The descriptive data for the pre-test and post-test are given in the following table:

**Table 2.** Pre-test and Post-test results for the experimental and control class

Class	Tests	Mean	Maximum	Minimum	Std. Deviation
Experimental Class	Pre-test	57.00	74.07	29.63	12.14
	Post-test	79.49	94.44	70.37	7.26
Control Class	Pre-test	66.19	74.07	42.59	8.18
	Post-test	69.62	81.48	48.15	9.68

Table 2 indicates that the experimental class's average pre-test and post-test scores were 57.00 and 79.49, respectively. The pre-test scores ranged from 29.63 to 74.07, and the post-test scores varied from 70.37 to 94.44. The average post-test score implies a considerable improvement in critical thinking abilities after utilizing the interactive e-module with Google Sites. On the other hand, the average pre-test and post-test scores in the control class are 66.19 and 69.62, respectively. The lowest pre-test score was 42.59; the highest score was

74.07. The lowest post-test score was 48.15, while the best was 81.48. This is shown by the post-test average score in critical thinking abilities using conventional methods, which is greater than the pre-test score. Furthermore, the findings of student engagement data before and after treatment with interactive e-modules assisted by Google Sites were evaluated using the Burch Engagement Survey for Students (BESS) developed by Burch et al., (2017), and delivered using Google Forms. This BESS comprises four factors: emotional, physical, and cognitive, divided into two sections, within and outside the classroom, with each component consisting of six questions designed to encourage student participation in learning. This test was administered to both the experimental and control classes. BESS description data before and after treatment are shown in the table below.

**Table 3.** BESS result for The Experimental and Control class

Class	BESS	Mean	Maximum	Minimum	Std. Deviation
Experimental Class	BESS Before	73.12	85.83	56.67	8.81
	BESS After	84.54	94.17	80.00	3.76
Control Class	BESS Before	73.80	84.17	55.83	8.10
	BESS After	77.43	85.00	61.67	7.19

Table 3 highlights that the experimental class's average BESS before and after scores were 73.12 and 84.54, respectively. The lowest BESS Before score was 56.67, while the best was 85.83. The lowest BESS After score was 80.00, while the best was 94.17. This is seen in the average BESS scores applying treatment with interactive e-modules assisted by Google Sites, which are higher than the BESS score before treatment. Meanwhile, the control group's average BESS before and after scores were 73.80 and 77.43, respectively. The lowest BESS Before score was 55.83, while the best was 84.17. The lowest BESS After score was 61.67, while the best was 85.00. This can be confirmed by the higher average BESS scores obtained after the conventional technique.

All data obtained in both the experimental and control classes is then analyzed using SPSS 23 to answer the research objectives provided. Data was analyzed in multiple steps, including preliminary tests (normality and homogeneity tests), Previous Ability Difference Tests, and hypothesis testing with the t-test and MANOVA. The normality test in this study employed Shapiro-Wilk since the samples were small. However, the homogeneity test used Wilcoxon and Mann Whitney to answer the hypothesis because it was observed during data processing that one of the data points was not normally distributed.

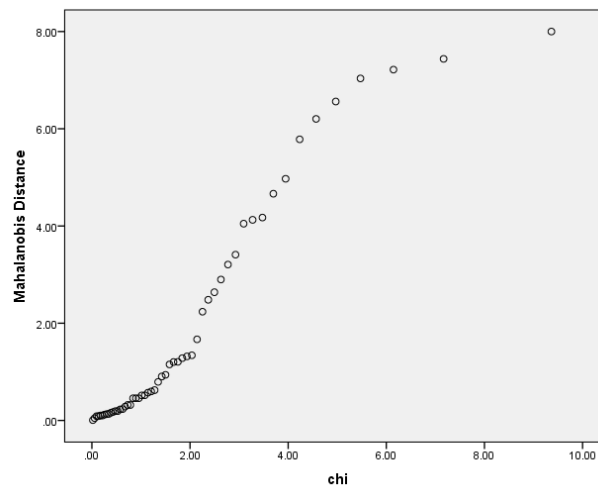
The findings of the assumption test of MANOVA show that learning engagement with critical thinking is linearly connected in the experimental and control classes, from the multicollinearity test performed that critical thinking and learning engagement are related to the strength of the relationship in the moderate category ( $R^2 = 0.088$ ) and Sig. 0.030 ( $< 0.05$ ), as a result, no signs of multicollinearity were identified. Furthermore, the univariate normality test indicated that material data for the experimental class is normally distributed, but material data for the control class is not normally distributed. The display data can be seen in the following table.

**Table 4.** Interpretation of Normality test result

Class	Sig. Shapiro Wilk	Explanation
Experimental class	0.300	$> 0.05$ Normally distributed
Control Class	0.005	$< 0.05$ Not normally distributed



Based on the table above, it is known that the significance value in the experimental class is 0.300 ( $> 0.05$ ) and in the control class, it is 0.005 ( $< 0.05$ ), which means that one of the data is not normally distributed. Moreover, the multivariate normality test shows that the data distribution of the two dependent variables has a multivariate normal distribution. This can be seen in the scatterplot graph below.



**Image 4.** Scatterplot graph

The graph above displays a propensity for the data distribution to form a straight line. This indicates that the dependent variable's data distribution implies a multivariate normal distribution. Furthermore, the homogeneity test shows that Asymp.Sig (2-tailed) has a value of 0.001. The value of 0.001 ( $0.001 < 0.05$ ) indicates that the data is homogeneous. Before conducting a hypothesis test, it is necessary to test for differences in beginning abilities (pre-testing) to verify that they do not influence the intervention's outcomes. This is accomplished by performing suitable statistical tests on the data to ensure accuracy and reliability. The N-Gain Score is classified as follows:

High ( $0.7 \leq \text{N-Gain} < 1$ ) indicates a significant gain.

Medium ( $0.3 \leq \text{N-Gain} < 0.7$ ): Significant progress

N-Gain values below 0.3 indicate a low gain.

The average Gain score in critical thinking for the experimental class (using interactive e-modules via Google Sites) is 0.05776, which falls in the median range of 0.28 to 0.80. The average Gain score for the control class (conventional method) is 0.1120, which falls in the low group and ranges from -0.06 to 0.32. The pre-test and post-test results are shown below.

**Table 5.** Gain Scores in experimental and control classes for critical thinking

Class		Mean	Maximum	Minimum	Std. Deviation
Experimental Class	Pre-test	57.00	74.07	29.63	12.14
	Post-test	79.49	94.44	70.37	7.26
	Gain Score	0.05776	0.80	0.28	0.14941
Control Class	Pre-test	66.19	74.07	42.59	8.18
	Post-test	69.62	81.48	48.15	9.68
	Gain Score	0.1120	0.32	-0.06	0.11814

The results indicate significant differences between the pre-test and post-test in both classes. The experimental class improved critical thinking skills, indicating that interactive e-modules using Google Sites are more successful than conventional methods.

Moreover, the gain score for learning engagement was determined by analyzing multiple tests from both the experimental and control groups. The N-Gain score test result provides: The average N-Gain score for the experimental class (interactive e-modules using Google Sites) in Learning Engagement is 0.3831, which stands in the median range of -0.29 to 0.65. Otherwise, the control class has an average N-Gain score of 0.1337, which is low, with scores ranging from -0.09 to 0.41. this can be seen in the following table.

**Table 6.** Cain Score of experimental and control classes for Learning Engagement

Class		Mean	Maximum	Minimum	Std. Deviation
Experimental Class	BESS Before	73.12	85.83	56.67	8.81
	BESS After	84.54	94.17	80.00	3.76
	Gain Score	0.3831	0.65	-0.29	0.22123
Control Class	BESS Before	73.80	84.17	55.83	8.10
	BESS After	77.43	85.00	61.67	7.19
	Gain Score	0.1337	0.41	-0.09	0.10304

The results show that the experimental class had a much higher level of learning engagement than the control class. The experimental class had higher maximum and minimum ratings, indicating that the intervention was more successful. Despite considerable variation, the intervention with interactive e-modules proved more effective in student engagement. This study aims to analyze the effect of interactive e-modules assisted by Google Sites on high school students' critical thinking skills and learning engagement in EFL classes. Three hypotheses are examined: (1) There is a significant difference in critical thinking skills between students who use interactive e-modules and those who use the conventional method, (2) There is a significant difference in learning engagement between students who use interactive e-modules and those who use the conventional method, (3) There is a simultaneous influence on critical thinking skills and learning engagement between students who use interactive e-modules and those who use conventional method. This finding can be seen in the following table.

**Table 7.** Multivariate test result

Effect		value	F	Hypothesis df	Sig
Class	Pillai's Trace	0.405	17.360	2.000	0.001
	Wilks' Lambda	0.595	17.360	2.000	0.001
	Hotelling's Trace	0.681	17.360	2.000	0.001
	Roy's Largest Root	0.681	17.360	2.000	0.001

**Table 8.** Test of Between-subjects effects

Source	Dependent variable	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Class	Critical Thinking Skill Result	1271.185	1	1271.185	17.551	0.001	0.252
	Learning Engagement Result	912.667	1	912.667	19.476	0.001	0.272

**Table 9.** Pairwise Comparison test results

Dependent Variable	(I) Class	(J) Class	Mean Difference (I-J)	Std. Error	Sig. <sup>b</sup>	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Critical Thinking	Experimental Class	Control Class	9.704*	2.316	.000	5.056	14.352
	Control Class	Experimental Class	-9.704*	2.316	.000	-14.352	-5.056
Learning Engagement	Experimental Class	Control Class	8.222*	1.863	.000	4.484	11.961
	Control Class	Experimental Class	-8.222*	1.863	.000	-11.961	-4.484

Hypothesis testing results show several findings as follows: 1) Mann-Whitney U test results show a significant difference (Asymp. Sig. = 0.001 < 0.05), which shows that interactive e-modules improve critical thinking skills more than conventional methods; 2) Wilcoxon test findings revealed substantial variation in learning engagement between groups. Mann-Whitney U test findings (Asymp. Sig. = 0.001 < 0.05) showed significant variations in learning engagement between the experimental and control classes; 3) Multivariate tests (Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root) indicate that class has a substantial influence on critical thinking skills and learning engagement (Sig. = 0.001). Between-subjects effects tests show that class substantially influenced critical thinking skills and learner engagement (sig. = 0.001). Pairwise comparisons show significant changes in critical thinking skills and student engagement between students using interactive e-modules and conventional methods (Sig. = 0.000 < 0.05). Compared to conventional methods, interactive e-modules utilizing Google Sites significantly boost students' critical thinking skills and learning engagement. The intervention has significant beneficial effects on high school.

The study discovered that creating interactive e-modules utilizing Google Sites significantly improved high school students' critical thinking abilities and learner engagement in EFL classrooms. A quantitative study revealed that the experimental group that utilized the e-modules outperformed the control group in many statistical tests (Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root). All p-values were less than 0.05, suggesting significant impacts on the dependent variables. Qualitative research confirmed these findings, with experimental class students indicating more emotional, physical, and cognitive involvement. They participated more actively in conversations, were more enthused, and cooperated more effectively than the control group. The key results included: Interactive e-modules significantly improved critical thinking skills, the experimental group was more emotionally and cognitively engaged, and the interactive e-modules increased students' overall engagement, interest, and collaboration.

The findings of this study align with prior studies on the effects of interactive e-modules and digital platforms on student engagement and critical thinking. The findings support those of Hidayat et al., (2023); Hung et al., (2020) and Zulfanida Ernest et al., (2023), which emphasized the necessity of combining simulations, case studies, and open-ended questions into e-modules to encourage deep engagement and critical thinking. Similarly, this study's interactive e-module contained activities like Padlet Conversations, which fostered critical

analysis of expository texts, and Quizizz Reading Comprehension, which evaluated comprehension and analytical abilities through open-ended questions. These strategies significantly improved the experimental class's critical thinking skills and student engagement. According to [Zulfanida Ernest et al. \(2023\)](#) Google Sites' collaborative capabilities encourage peer learning and productive conversations, leading to stronger critical views among students. In this study, Google Sites made it easier to examine and critique expository texts using Google Docs while also boosting peer learning and collaborative problem-solving. Additionally, applications such as Padlet and Quizizz enabled students to express ideas, receive comments, and engage in discussions, improving their critical thinking skills. The high levels of student participation and engagement in the experimental class support the collaborative benefits of Google Sites, consistent with [Zulfanida Ernest et al. \(2023\)](#).

Overall, the findings of this study support the conclusions of [Hidayat et al. \(2023\)](#); [Hung et al. \(2020\)](#); & [Zulfanida Ernest et al. \(2023\)](#), demonstrating that integrating interactive e-modules with collaborative digital platforms significantly improves students' critical thinking abilities and learning engagement. Google Sites' interactive and collaborative features produced a rich learning environment that promoted more significant engagement with information, analytical thinking, and positive peer connections. This study emphasizes the potential of digital learning technologies to revolutionize conventional teaching methods and enhance students' achievements.

## CONCLUSION

This study investigated how interactive e-modules designed with Google Sites affected high school students' critical thinking abilities and learner engagement in EFL (English as a Foreign Language) courses. Detailed research was conducted using both quantitative and qualitative approaches. Key results of the study include: Statistical analysis revealed that the interactive e-module considerably improved students' critical thinking skills, with multivariate analyses indicating significant differences between the experimental and control groups; Both quantitative and qualitative data showed a significant increase in learning engagement among students in the experimental class. Survey findings revealed that the experimental group had higher emotional, physical, and cognitive engagement levels than the control group. Qualitative evidence from study notes showed that the experimental class had higher levels of student involvement, passion, and collaboration. The usage of interactive e-modules increased interest both in and out of the classroom. Students were more emotionally attached, actively engaged, and cognitively invested in learning. The interactive e-modules offered a more dynamic and engaging learning environment, improving learning outcomes and motivating students. The findings have various implications for EFL instruction, including the possibility that implementing interactive e-modules into EFL classes may significantly enhance student engagement and critical thinking skills. This method can make learning more engaging and pleasant. It may also be used for developing instructional materials, although this requires investment in technical resources and teacher training to be effective. Qualitative feedback, such as research notes, can help teachers improve their teaching approaches and more effectively satisfy the requirements of their students.

This study highlights the significant positive impact of interactive e-modules facilitated by Google Sites on critical thinking skills and student engagement in high school EFL classes. Integrating these modules into teaching practices allows educators to create a more interesting and successful learning environment. The findings emphasize the necessity of

investing in educational technology, offering professional development for teachers, and constantly improving teaching techniques based on qualitative feedback. Future studies should look at the long-term consequences and other elements that influence the effectiveness of interactive e-modules in education.

## BIBLIOGRAPHY

- Budiwati, R., Budiwati, R., & Fauziati, E. (2022). Merdeka belajar dalam perspektif Ki Hajar Dewantara. *Elementa: Jurnal Pendidikan Guru Sekolah Dasar*, 4(1), 67-79. <https://doi.org/10.33654/PGSD>
- Burch, G. F., Burch, J. J., & Womble, J. (2017). Student engagement: An empirical analysis of the effects of implementing mandatory web-based learning systems. *Organization Management Journal*, 14(2), 116–125. <https://doi.org/10.1080/15416518.2017.1325349>
- Creswell, W. J., & Creswell, J. D. (2018). Research design: Qualitative, quantitative and mixed methods approaches. In *Journal of Chemical Information and Modeling*, 53(9), 432-445.
- Diansah, I., & Asyhari, A. (2020). Effectiveness of physics electronic modules based on Self Directed Learning Model (SDL) towards the understanding of dynamic fluid concept. *Journal of Physics: Conference Series*, 1572(1), 012024. <https://doi.org/10.1088/1742-6596/1572/1/012024>
- Facione, P. a. (2011). Critical thinking : What it is and why it counts. In *Insight assessment* (Issue ISBN 13: 978-1-891557-07-1).
- Hidayat, H., Hidayat, O., & Widiasih, W. (2023). Development of google sites-based learning resources to improve mastery of concepts and process skills in electrical circuit materials. *Jurnal Penelitian Pendidikan IPA*, 9(2), 4624–4631. <https://doi.org/10.29303/jppipa.v9i6.3612>
- Hung, C.-C., Kao, H.-F., Liu, H.-C., Liang, H.-F., Chu, T.-P., & Lee, B.-O. (2020). Effects of simulation-based learning on nursing students' perceived competence, self-efficacy, and learning satisfaction: A repeat measurement method. *Nurse Education Today*, 97(5), 104725. <https://doi.org/10.1016/j.nedt.2020.104725>
- Jihan Nabilah, N., Dewina, Z., & Muhammadiyah Hamka, U. (2023). The effect of using google sites media on the learning outcomes of science and technology students in grade V. *Jurnal Cakrawala Pendas*, 9(1), 61–69. <https://doi.org/10.31949/JCP.V9I1.3713>
- Kepmendikbudristekdikti. (2022). *Pedoman penerapan kurikulum dalam rangka pemulihan pembelajaran*. Kemdikbudristek.
- Khalifatussalam, R. I. (2021). Low literacy in Indonesia: Understanding and factors that influence it. *Low Literacy in Indonesia: Understanding and Factors That Influence It*, November, 1–8.
- Munir, S., Fitrianti, W., & Megasari, R. (2023). Interactive e-module: The economic learning solutions in high school during the covid-19 pandemic. *Jurnal Pendidikan Ilmu Sosial*, 32(2), 140–154. <https://doi.org/10.23917/jpis.v32i2.20360>
- Pertiwi, A. D., Nurfatimah, S. A., & Hasna, S. (2022). Menerapkan metode pembelajaran berorientasi student centered menuju masa transisi Kurikulum Merdeka. *Jurnal Pendidikan Tambusai*, 6(2), 8839–8848.
- Pertiwi, I. E., & Purnawarman, P. (2023). Google sites as an e-learning module for online learning: a Mode of choice during the covid-19 pandemic. *PROJECT (Professional Journal of English Education)*, 6(1), 187–200. <https://doi.org/10.22460/project.v6i1.p187-200>
- Purnadewi, G. A. A., & Widana, I. W. (2023). Improving student's science numeration capability through the implementation of PBL model based on local wisdom. *Indonesian*

- Journal of Educational Development (IJED)*, 4(3), 307-317.  
<https://doi.org/10.59672/ijed.v4i3.3252>
- Sagita, S., Rahmat, A., Priyandoko, D., & Sriyati, S. (2023). The potency of google sites to enhance students performance in research skills. *Pedagonal: Jurnal Ilmiah Pendidikan*, 7(2), 92–104. <https://doi.org/10.55215/pedagonal.v7i2.8843>
- Sèna, H. U. O., & Etienne, I. K. (2022). Fostering students' critical thinking skills in efl advanced classroom. *Studies in English Language Teaching*, 10(3), 94-106. <https://doi.org/10.22158/selt.v10n3p94>
- Sevtia, A. F., Taufik, M., & Doyan, A. (2022). Pengembangan media pembelajaran fisika berbasis google sites untuk meningkatkan kemampuan penguasaan konsep dan berpikir kritis peserta didik SMA. *Jurnal Ilmiah Profesi Pendidikan*, 7(3), 1167–1173. <https://doi.org/10.29303/jipp.v7i3.743>
- Sukendra, I. K., Widana, I. W., Juwana, D. P. (2023). Senior high school mathematics e-module based on STEM. *Jurnal Pendidikan Indonesia*, 12(4), 647-657. <https://doi.org/10.23887/jpiundiksha.v12i4.61042>
- Sumandya, I. W., Widana, I. W., & Nugraha, I., N., B., S. (2022). The skills of high school mathematic teachers in utilizing the *merdeka belajar* plattform. *Indonesian Research Journal in Education |IRJE|*, 6(2), 455 - 464. <https://doi.org/10.22437/irje.v6i2.22504>
- Widana, I. W., & Laksitasari, B. D. (2023). Improving students learning outcomes on circle equation material using geogebra software. *Indonesian Journal of Educational Development (IJED)*, 4(1), 32-39. <https://doi.org/10.59672/ijed.v4i1.2792>
- Zakiyah, W. I., & Dwiningsih, K. (2022). The effectivity of interactive e-module to increase the students' visual-spatial intelligence on ionic. *Jurnal Inovasi Teknologi Pendidikan*, 9(1), 91–100. <https://doi.org/10.21831/jitp.v9i1.46561>
- Zulfanida Ernest, I., Mulya, D., & Putra, M. (2023). The use of google sites-based electronic modules in science learning against digital literacy of junior high school students. *JPI (Jurnal Pendidikan Indonesia)*, 12(2), 293–304. <https://doi.org/10.23887/JPIUNDIKSHA.V12I2.56311>