

EMPOWERING TERTIARY STUDENTS' ARGUMENTATIVE LITERACY THROUGH A TECHNOLOGY-ENHANCED THINKING-TOGETHER E-MODULE

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Abstract: In the digital era, equipping students with critical literacy and character-building competencies is essential for nurturing future-ready learners. This study investigates the development and impact of a technology-enhanced Thinking-Together Approach (TTA) e-module designed to improve argumentative writing among tertiary-level students. Grounded in socio-cognitive theory and dialogic pedagogy, the TTA e-module integrates collaborative reasoning and ethical discourse as foundational elements of academic literacy and character education. Developed through the ADDIE instructional model and guided by the Model-Technology (M-T) integration framework, the module was implemented via the *FlexLearn* platform in a quasi-experimental study involving 75 students across control and experimental groups. Quantitative findings revealed a statistically significant improvement in students' argumentative writing performance in the experimental group. Qualitative data highlighted enhanced abilities in constructing reasoned arguments, engaging empathetically in peer dialogue, and reflecting critically on the writing process. Despite challenges such as varying digital literacy levels and collaboration dynamics, the study demonstrates that theoretically grounded digital tools can effectively support both literacy development and character formation. Lastly, the Implications for integrating dialogic and technology-enhanced instruction into language curricula are discussed.

Keywords: *argumentative literacy, technology-enhanced learning, dialogic pedagogy, socio-cognitive theory, tertiary education*

INTRODUCTION

In today's rapidly evolving digital landscape, the ability to think critically, communicate persuasively, and collaborate ethically has become foundational for student success, both within academia and in broader society (Warsah et al., 2021). As education systems increasingly turn to technology-enhanced pedagogies, there is growing recognition of the need to integrate tools that not only promote literacy development but also foster character formation (Hamzah et al., 2024). Therefore, with the advancement of technology, education systems worldwide are adopting tools that enrich the learning experience. These tools can range from online learning platforms, educational apps, gamification, electronic modules, to virtual and augmented reality systems that provide immersive experiences. The idea behind

using these tools is to enhance traditional methods of teaching by providing more interactive, flexible, and personalised learning opportunities.

The design of the Thinking-Together Approach (TTA) e-module is firmly rooted in Vygotsky's (1978) social constructivist theory, which posits that learning is socially mediated and advanced through scaffolded interaction in the Zone of Proximal Development (ZPD). Within the e-module, collaborative writing activities, peer feedback exchanges, and dialogic tasks function as scaffolds that enable students to extend their reasoning and literacy practices beyond what they could achieve independently. The use of digital tools such as forums, shared documents, and quizzes becomes part of the mediational means that facilitate this progression.

At the same time, the TTA e-module embodies Alexander's (2018) dialogic teaching theory, as it deliberately structures opportunities for students to engage in reciprocal, respectful, and evidence-based dialogue. Through peer discussions, argumentation tasks, and reflection prompts, students are encouraged not only to articulate their own ideas but also to critically respond to, refine, and build upon the contributions of others. This dialogic process cultivates both cognitive and ethical growth, reinforcing the module's aim to develop argumentative literacy while nurturing interpersonal sensitivity and collaborative responsibility.

By operationalising these theoretical perspectives, the TTA e-module demonstrates how technology-enhanced dialogic pedagogy can simultaneously strengthen academic competencies and character development, preparing students for success in both academic and societal contexts.

This shift aims to make learning more engaging, efficient, and accessible to a broader audience. In addition, the incorporation of the Thinking Together Approach (TTA henceforth) by Kuhn et al (2017) is to enhance the students' ability to think and develop arguments contributes significantly to empowering argumentative literacy, particularly through the structured and collaborative engagement fostered by a technology-enhanced e-module in tertiary education. The Thinking Together Approach by Kuhn et al. (2017) was chosen for its effectiveness in promoting dialogic argumentation, critical thinking, and collaborative reasoning through structured peer discourse. It encourages students to reason together rather than argue to win, fostering the development of argumentative literacy, an essential skill in tertiary education. Therefore, it aligned with the goals of our technology-enhanced e-module, the approach supports both asynchronous and synchronous peer interactions, enabling sustained reflection and improved argumentation skills. This directly contributes to the module's aim of empowering students with higher-order thinking abilities.

The available e-module for English as Second Language (ESL) and English for Foreign Language (EFL) students are more on general language learning module (Aiju & Abdullah, 2024), and certain e-module that focuses on writing are more on fostering critical thinking and essay writing (Wardani et al, 2025) and report writing and to write short story (Sholilah et al, 2024). In addition, the e-modules were implemented amongst high school students (Fadilah, 2024), and very lack of e-modules that cater to specific writing skills, in this case is the argumentative writing amongst students at the tertiary level. Therefore, within this context, writing skills, particularly argumentative writing, stand out as a core component of

language learning, requiring students to structure coherent claims, evaluate evidence, and engage with diverse viewpoints.

Despite its importance, teaching argumentative literacy poses persistent challenges, particularly in ensuring that students develop both the cognitive skills for constructing sound arguments and the interpersonal competencies needed for respectful academic discourse (Ramli et al., 2024; Sabri et al., 2021). Besides, it is also highlighted that peer feedback and the self-reflective process help improve argumentative writing (Li & Hebert, 2024). Therefore, responding to these challenges, the Thinking-Together Approach (TTA henceforth) is a dialogic and socio-cognitive pedagogy that offers a promising framework for fostering collaborative reasoning and ethical engagement among learners. When paired with digital technologies, TTA's emphasis on joint construction of knowledge, active listening, and mutual respect gains further pedagogical value.

This study investigates the integration of a technology-enhanced TTA e-module in a tertiary-level language learning context, focusing on its impact on students' argumentative essay writing skills. Therefore, by examining the module's design, implementation, and outcomes, this paper contributes to ongoing discourse on how educational technologies can meaningfully support language literacy and character development in higher education settings.

METHODS

Research Design

This study employed a quasi-experimental design with a non-equivalent control group to investigate the impact of a technology-enhanced Thinking-Together Approach (TTA) e-module on the argumentative essay writing skills of tertiary-level students. The teaching of argumentative writing in the experimental group followed the TTA e-module, which not only provided content on argumentative writing but also guided the process of instruction, including collaborative tasks, discussion prompts, and structured writing activities. Instruction was carried out over nine weeks, with a total of nine class meetings, each designed with specific stages of the teaching–learning process. The first stage focused on introducing argumentative writing and identifying claims, counterclaims, and evidence (aim: familiarisation with argumentative structures). The second stage emphasised critical reading and group discussion of sample texts (aim: developing analytical and evaluative skills). The third and fourth stages involved guided practice in planning and drafting argumentative essays using prompts provided in the module (aim: scaffolding the construction of arguments). The fifth stage centred on peer collaboration and feedback using the TTA framework (aim: refining reasoning and clarity). The sixth stage focused on revising and finalising the essay for assessment (aim: producing a coherent, well-structured argumentative text). Subsequent sessions reinforced these stages with progressively complex tasks, ensuring continuity and deeper engagement across the nine-week period. The control group, in contrast, received instruction following the conventional module content only, which outlined the features of argumentative writing but offered minimal guidance on collaborative and process-oriented strategies.

Participants

Purposive sampling was employed to select participants from a population of undergraduate students enrolled in a writing proficiency course at a Malaysian tertiary institution. The sample consisted of 75 students, divided into two intact classes: an experimental group (n = 45) that received instruction via the TTA e-module and a control group (n = 30) that was taught using a conventional teacher-centred approach with the university's standard writing module. Both groups underwent instruction for a duration of nine weeks, and all participants demonstrated comparable levels of language proficiency based on prior academic records and placement test results.

E-Module Development Using the ADDIE and Model-Technology (M-T) Integration Models

The Thinking-Together Approach (TTA) e-module was systematically designed and developed using the ADDIE instructional design model (1975, in Peterson, 2003), encompassing five structured phases: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model offers a structured and systematic approach to instructional design, ensuring that each phase is thoroughly addressed. This results in well-aligned learning objectives, content, and assessments, enhancing both teaching effectiveness and learner outcomes. Additionally, its iterative nature allows for continuous improvement of the module based on feedback and evaluation.

In parallel, the Model-Technology (M-T) integration model was employed to ensure purposeful alignment between instructional goals and the technological tools embedded within the module. The M-T model enhances e-module design by promoting coherent instructional strategies, learner engagement, and the optimisation of digital features to support meaningful learning experiences. This integration ensures that the selected technologies reinforce the intended learning outcomes effectively.

The theoretical foundations of the e-module are grounded in Vygotsky's (1978) social constructivist theory, which posits that learning is socially mediated and advanced through interaction within the Zone of Proximal Development (ZPD). In the TTA e-module, dialogic tasks, peer collaboration, and scaffolded digital tools function as mediational means that support learners in moving from assisted to independent performance in argumentative writing and critical thinking. Complementing this, the module draws on Alexander's (2018) dialogic teaching theory, which emphasises structured, reciprocal, and respectful dialogue as a driver of both cognitive and interpersonal growth. By embedding dialogic practices such as peer feedback, collaborative reasoning, and joint knowledge construction, the TTA e-module cultivates both literacy and ethical communication skills.

Therefore, this dual-model approach is anchored in ADDIE and M-T integration while underpinned by social constructivist and dialogic teaching principles to ensure that the TTA e-module achieved both pedagogical coherence and technological relevance in promoting argumentative writing, collaborative thinking, and character development.

Analysis

A comprehensive needs analysis was conducted through surveys and interviews with the selected students and instructors to uncover deficiencies in argumentative writing and identify barriers to dialogic and collaborative learning. Based on the survey and findings, key learning outcomes were established as it is to improve argumentative writing among students. The majority of the students are having difficulties in writing argumentatively, as they claim they do not have any ideas to argue. Besides, some of them claim that they just agree or disagree with the statement without having any idea to justify it. The M-T model informed decisions about which digital tools would best support these outcomes, highlighting the need for platforms that facilitate real-time collaboration and structured interaction.

Design

The design phase involved mapping learning outcomes, assessment methods, and the instructional flow of the module. Strategies such as peer collaboration, guided discussions, and scaffolded writing tasks were selected. Learning activities were sequenced to gradually build skills from recognising argumentative structures to composing full-length essays. In line with the M-T model, technology choices were guided by their capacity to support dialogic pedagogy; therefore, several tools were selected to enable synchronous and asynchronous exchanges, written feedback, visual feedback, and layered learning scaffolds. Lastly, forum discussion, which caters to written feedback, was chosen for the group amongst students, and the lecturers will use visual feedback if needed for the students.

Development

Interactive content was developed and uploaded using the platform called *Flexlearn*. This platform was chosen based on the students' accessibility, and it has multiple features that suit the development of the e-module. The e-module featured multimedia elements (e.g., model essays and video explanations by the lecturers), peer feedback templates, collaborative discussion forums, and annotated writing samples. Since it emphasises the TTA principles, dialogic tools were integrated to foster structured peer interaction and reflective dialogue that were based on a forum discussion. The M-T model was used to match these features with specific pedagogical intents, ensuring that every technological element had a targeted instructional function.

Implementation

Over 9 weeks, the e-module was deployed among the experimental group. The first and the last week were used for the argumentative written tests. Students received training on using the digital tools and were introduced to the TTA's core values of empathy, reasoned discourse, and cooperative learning. Weekly sessions combined individual writing tasks with structured peer interaction, reflective exercises, and visual feedback from the lecturers if needed. The M-T model ensured that the technological environment remained learner-centred, facilitating ease of use and sustained engagement across activities.

Evaluation

Both formative and summative evaluations were conducted. Formative feedback collected after the e-module implementation led to iterative adjustments in task design and future e-modules. Summative evaluation compared pre and post-test writing performance and gathered qualitative data on student engagement, collaboration, and perception of learning. The M-T model also guided post-hoc analysis to assess how effectively the technological components supported the instructional goals, contributing insights for future refinement and scaling of the module.

Instruments

A quasi-experimental design with a non-equivalent control group was adopted to comprehensively assess the effectiveness of the TTA e-module in improving argumentative writing skills and promoting collaborative learning. The instruments encompassed both quantitative and qualitative tools, ensuring triangulation of data for validity and depth of insight.

Pre and Post-Test Argumentative Writing Tasks

The first step to evaluate improvements in students' argumentative writing proficiency is to examine their writing. Participants were required to complete two timed writing tasks. The first one was administered before the intervention (pre-test) and the other after completing the module (post-test). These tasks were standardised prompts requiring students to write argumentative essays on current and debatable issues. Both tests are different but similar in terms of theme. The responses were analysed for changes in four key dimensions in Table 1 below:

Table 1. Criteria to Analyse Pre and Post Argumentative Writing

Criterion	Elaboration of The Criteria
Structural organisation	Clarity of thesis, logical paragraphing
Content depth and relevance	Use of evidence, argument elaboration
Cohesion and coherence	transitions, linking devices
Critical reasoning	addressing counterarguments, justifying claims

In evaluating academic writing, four interrelated criteria provide a comprehensive framework for assessment. First, structural organisation emphasises the clarity of the thesis statement and the logical arrangement of paragraphs, ensuring that ideas unfold in a coherent and purposeful sequence. Second, content depth and relevance highlight the writer's ability to support claims with appropriate evidence and to develop arguments with sufficient detail and elaboration. Third, cohesion and coherence focus on the effective use of transitions and linking devices, which guide the reader smoothly from one idea to the next and establish overall unity in the text. Finally, critical reasoning underscores the importance of engaging with counterarguments and justifying one's claims, thereby demonstrating analytical rigor and intellectual maturity. Together, these criteria not only define the quality of academic writing but also provide a rationale for evaluating how effectively a writer communicates complex ideas.

This instrument provided a direct measure of the learning gains attributable to the e-module. Each criterion was rated on a 5-point scale, and scores were averaged across two independent raters to ensure inter-rater reliability. The rubric facilitated detailed, criterion-specific feedback and enabled comparison between pre and post-test performances. The students pre and post-writing test were presented in Appendix A and Appendix B.

Student Perception Questionnaire

A Likert-scale survey was administered post-intervention to capture students' subjective experiences and evaluations of the TTA e-module. The questionnaire was organised into thematic sections, including:

1. the usability of the e-module (that includes the ease of navigation and clarity of instructions),
2. the engagement of the e-module (that includes students' interest, motivation, and participation),
3. the e-module's pedagogical value (that includes perceived impact on argumentative writing skills, critical thinking, and collaboration), and
4. the technological effectiveness (which includes the effectiveness of tools like quizzes and forums in supporting learning).

The summary of the responses is later presented in the analyses part. Responses were quantitatively analysed to identify trends in student satisfaction and perceived benefits of the module, and finally to inform future improvements of the e-module.

Semi-structured interviews

In addition to complementing the survey data and deepening the understanding of the learners' experiences, semi-structured interviews were conducted on six (6) selected students from the experimental group. These sessions explored:

1. student reflections on peer collaboration and dialogic learning,
2. challenges faced during digital engagement and writing development,
3. suggestions for module improvement and tool usability.

Interviews were recorded, transcribed, and thematically coded using Braun and Clark (2023) to extract qualitative insights, particularly on how the Thinking-Together Approach and the digital tools influenced their learning processes and interpersonal skills.

FINDINGS AND DISCUSSION

In this study, two analyses were conducted. The first one is the quantitative data (which includes the essay scores and also the students' perception questionnaire) were analysed using descriptive statistics and paired-samples t-tests to determine the significance of differences between the experimental and control groups. The qualitative data from the interviews were coded thematically to identify recurring patterns related to collaborative discourse, character development, and digital engagement.

Quantitative Findings

For the quantitative part, we evaluated the impact of the Thinking-Together Approach (TTA) e-module on students' argumentative writing performance. The aspects that were analysed were presented in Table 1. Therefore, a paired-samples *t*-test was conducted to compare the pretest and post-test scores of the experimental and control groups.

Normality test (Shapiro-Wilk Test)

Before conducting hypothesis testing, it was necessary to verify that the data met the key assumptions required for parametric statistical analysis, namely normality and homogeneity of variance.

In this study, the researcher employed the Shapiro–Wilk Test to ascertain whether the student participants' writing scores originated from a normally distributed population, as normality is a fundamental prerequisite for tests such as the *t*-test and ANOVA. The Shapiro–Wilk Test was performed on both the pretest and post-test writing scores. As shown in Table 2, the observed probability values (0.73, 0.53, 0.71, and 0.18) all exceeded the threshold of $p > 0.05$, indicating that the data did not deviate significantly from normality. Thus, the samples could be assumed to follow a normal distribution.

In addition to normality, the assumption of homogeneity of variance was examined using Levene's Test, which evaluates whether the variances of the groups being compared are equal. Meeting this assumption is essential because unequal variances can compromise the validity of parametric tests. In this study, Levene's Test produced non-significant results ($p > 0.05$), confirming that the variance across groups was sufficiently homogeneous to proceed with further testing.

Having established that both assumptions of normality and homogeneity were satisfied, the researcher proceeded with hypothesis testing using parametric inferential statistics. Specifically, an independent-samples *t*-test (for between-group comparisons) and paired-samples *t*-test (for within-group comparisons) were employed to determine whether the Thinking-Together Approach (TTA) e-module had a statistically significant effect on students' argumentative writing performance. These tests allowed the researcher to draw valid inferences about the efficacy of the intervention while ensuring that the underlying statistical assumptions were not violated.

Table 2. Test of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Pre Control	.890	30	0.73
Post Control	.930	30	0.53

Overall Pretest and Post-Test Scores for the Experimental Group

A paired-sample *t*-test was conducted to evaluate the impact of the module on students' overall argumentative writing scores. There was a statistically significant increase in overall scores from the pretest ($M = 70.36$, $SD = 7.31$) to the post-test ($M = 80.65$, $SD = 6.35$), $t(44) = -7.34$, $p < .001$ (two-tailed). The mean increase in overall score was 10.41, with a 95% confidence interval ranging from -13.27 to -7.55

Table 3. Results for Paired Samples T-test for Overall Scores

	Shapiro-Wilk		
	Statistic	df	Sig.
Pre_Test_Treatment	.987	45	0.71
Post_Test_Treatment	.959	45	0.18

Table 4. Results for Mean and Standard Deviation for Pretest and Post-test for Overall Scores

Variable	Mean	N	Std. Deviation	Std. Error Mean
Pre-Test Overall Score	70.36666666	45	7.316973784	1.068390862
Variable	Mean	N	Std. Deviation	Std. Error Mean
Post-Test Overall Score	80.65	45	6.35	.947

A paired-samples *t*-test in Table 3 was conducted on the students' texts to compare the overall scores before and after the intervention. The results showed that post-test scores ($M = 80.65$, $SD = 6.35$) were significantly higher than pretest scores ($M = 70.37$, $SD = 7.32$), $t(44) = -12.83$, $p < .001$. The mean increase was 9.31 points. The effect size was very large, Cohen's $d = 1.91$, with $\eta^2 = .79$, indicating that approximately 79% of the variance in scores was attributable to the intervention. The eta squared statistic (.55) indicated a large effect size (Cohen, 1988). This reinforces the substantial impact of the e-module on students' writing development. Hence, it could be concluded that the Thinking-Together e-module helped the students improve their argumentative writing to a significant extent. The analysis result, mean and standard deviation scores for the overall score, the pretest, and post-test overall scores are found in the Table 3 above.

Students' Perception Questionnaire Results

A post-intervention Likert-scale questionnaire was administered to evaluate students' perceptions of the TTA e-module. Seventy-five students participated in the survey: 45 in the experimental group and 30 in the control group. The questionnaire consisted of items grouped into four thematic domains: Usability, Engagement, Pedagogical Value, and Technological Effectiveness. Each item was rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

The result is to examine whether there were statistically significant differences in perceptions between the experimental and control groups; independent samples *t*-tests were conducted for each domain. The assumptions of normality and homogeneity of variances were assessed and met before analysis.

Usability

Students in the experimental group reported significantly higher usability scores ($M = 4.30$, $SD = 0.60$) compared to the control group ($M = 3.80$, $SD = 0.70$). An independent samples *t*-test indicated that this difference was statistically significant, $t(73) = 3.31$, $p = .001$, $d = 0.77$, suggesting a medium to large effect size. These results indicate that the TTA e-module

was regarded as easier to navigate and clearer in its instructions compared to traditional materials.

Engagement

The experimental group reported significantly higher engagement ($M = 4.50$, $SD = 0.50$) compared to the control group ($M = 3.60$, $SD = 0.90$). The difference was statistically significant, $t(73) = 5.15$, $p < .001$, $d = 1.20$, indicating a large effect size. The elevated engagement scores in the experimental group imply that the module's multimedia, quiz elements, forum discussions, and interactive features substantially enhanced students' motivation and participation.

Pedagogical Value

A significant difference was found in perceived pedagogical value between the experimental ($M = 4.60$, $SD = 0.40$) and control ($M = 3.90$, $SD = 0.60$) groups, $t(73) = 5.90$, $p < .001$, $d = 1.38$. This large effect size highlights students' perception that the TTA e-module meaningfully supported their development in argumentative writing, critical thinking, and collaboration more than traditional methods.

Technological Effectiveness

The experimental group also reported significantly higher ratings of technological effectiveness ($M = 4.40$, $SD = 0.50$) compared to the control group ($M = 3.40$, $SD = 0.80$), $t(73) = 5.87$, $p < .001$, $d = 1.36$. Students in the experimental group perceived embedded tools such as quizzes and forums as highly effective in supporting their learning.

Table 5. Group Comparison of Perceived Effectiveness Across Domains

Domain	Experimental (n = 45)	Control (n = 30)	<i>t</i> (73)	<i>p</i>	<i>d</i>
Usability	4.30 (0.60)	3.80 (0.70)	3.31	.001	0.77
Engagement	4.50 (0.50)	3.60 (0.90)	5.15	< .001	1.20
Pedagogical Value	4.60 (0.40)	3.90 (0.60)	5.90	< .001	1.38
Technological Effectiveness	4.40 (0.50)	3.40 (0.80)	5.87	< .001	1.36

Summary of the Quantitative Findings

Table 5 above summarises the means, standard deviations, and *t*-test results for each domain. Statistically significant differences were observed across all four domains, with students in the experimental group reporting significantly more favourable perceptions than those in the control group. The large effect sizes across the domains of engagement, pedagogical value, and technological effectiveness suggest that the TTA e-module substantially enhanced students' learning experience. These findings underscore the value of interactive digital modules in fostering engagement, improving learning outcomes, and providing pedagogically sound technological integration.

Qualitative Findings

Qualitative data from semi-structured interviews were analysed using Braun and Clarke's (2023) six-phase thematic analysis, which provided a structured yet flexible framework for identifying and interpreting patterns of meaning. Figure 1 below explains the six-phase thematic analysis by Braun and Clarke (2023).

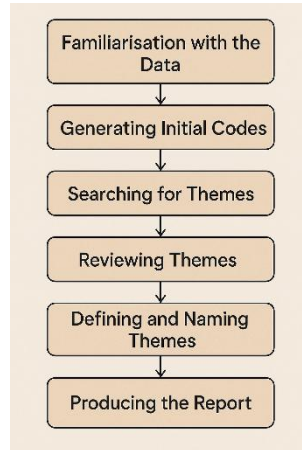


Figure 1. Six-phase Thematic Analysis (Braun & Clarke, 2023)

The first step that we did was to get familiar with the dataset that was derived from the semi-structured interview with the six (6) selected students. The selection includes two (2) students who score higher marks, two (2) students with average scores, and two (2) students with low marks. The reason we chose these students is to ensure fairness in the interview and to prove that the thinking-together e-module not only benefits the good students but also students with low marks. In this first step, the recordings were transcribed verbatim and read multiple times to ensure deep engagement with the content. The second step is to generate the initial codes, as it was conducted manually and later reviewed using qualitative software, NVivo, to identify the codes. Codes captured key features related to students' experiences with collaborative learning, argumentation, and character-building. The third step is to search for themes. The codes captured were collated into the potential themes that reflect the shared meanings across participants. The fourth step is to review the suitable themes for the interview. The themes were checked against the coded extracts and the entire dataset to ensure coherence and distinction. The fifth step is to define and name the themes. In this step, the final themes were clearly defined to capture the essence of the participants' views based on the interviews. Lastly, the final step is to produce the report, as the representative quotes from the interview were selected to support each theme.

Emergent Themes

Thematic analysis of the data yielded three salient themes, each elucidating the cognitive, interpersonal, and technological dimensions of students' experiences within the e-module. These themes reflect the dynamic interplay between structured pedagogical design, dialogic interaction, and digital mediation in fostering collaborative academic writing.

Structured Collaboration Enhances Argumentative Reasoning

Participants consistently reported that the scaffolded nature of the e-module significantly supported the development of argumentative thinking. Structured prompts and sequenced writing tasks were perceived as instrumental in guiding students through the logical progression of ideas, thereby facilitating the construction of coherent and well-substantiated arguments. Several respondents indicated that these scaffolds enabled them to “think more logically” and “build arguments step-by-step,” suggesting a heightened ability to organise and articulate complex positions. Several justifications from the students support this theme. For example:

“I used to just write straight away, but the steps helped me organise my ideas better.”
(Student 5)

“The prompts in the e-module made me think about the other side of the argument first, which I never used to do.” (Student 1)

“I truly enjoyed the activities, such as forum discussion and the quiz. It does not make me bored, and I managed to improve my arguments (Student 3)

It can be concluded that the application of the Thinking Together framework further augmented this process by promoting collective reasoning practices. Principles such as co-elaboration, justification, and cumulative talk created an environment conducive to the negotiation of meaning and the refinement of ideas through peer dialogue. One student remarked, “Breaking down arguments with my peer made it easier to refine my thesis,” underscoring the role of collaborative discourse in deepening metacognitive engagement and improving the structural clarity of written work.

Dialogic Engagement Fosters Empathy and Respectful Discourse

A second emergent theme pertains to the affective and ethical dimensions of dialogic engagement. Many participants reported that engaging in peer discussion and feedback activities contributed to an increased awareness of diverse perspectives and a corresponding growth in interpersonal sensitivity. Students described learning to value and consider opinions that diverged from their own, with one noting, “I learned to value my friend’s opinion even when I didn’t agree.” Besides, there are also comments from the participants on this. For example:

“I enjoyed the forum discussion as sometimes I don’t have the idea but after I participate in the discussion, I’ll have more ideas to write and even say.” (Student 4)

“It’s okay..I think the feedback activity from the lecturer and friends are very useful.”
(Student 6)

During one feedback session, a classmate from a very different cultural background gave comments on my case analysis. At first, I was taken aback because their priorities in the situation were so different from mine. But when they explained their reasoning, it made total sense. It wasn’t just about the content, it made me realise how much my values shaped my

judgments, and that others might prioritise compassion or community differently.” (Student 2)

This openness to differing viewpoints reflects a maturation in perspective-taking and a movement toward respectful, constructive dialogue, foundational components of democratic communicative practice. Furthermore, several participants highlighted the development of more empathetic and tactful feedback skills, suggesting that the e-module fostered not only academic but also socio-emotional competencies essential for collaborative learning.

Digital Mediation as a Source of Motivation and Friction

The final theme captures students’ perceptions of the digital medium as both enabling and, at times, constraining peer collaboration. On the one hand, digital tools such as interactive writing interfaces, real-time editing, and comment-based feedback were widely regarded as enhancing engagement and motivation. Students characterised the experience as “more interactive” and “less boring,” with several noting that the novelty and immediacy of digital platforms helped sustain interest in the writing process.

Conversely, the online format also introduced challenges, particularly in managing peer dynamics. A minority of participants expressed concerns regarding uneven participation, with comments pointing to issues of accountability and collaboration equity. For example, one student stated, “I had to do most of the writing,” reflecting a sense of imbalance in group contributions. These findings suggest that while digital tools can effectively scaffold collaboration, their success is contingent upon the presence of clear expectations, role delineation, and facilitative oversight to mitigate disparities in student engagement.

“It was fun because I could post my answers and see others’ instantly—like a safe debate.” (Student 4)

*“Some groupmates didn’t comment seriously, and it felt a bit one-sided at times.”
(Student 1)*

*“I enjoy writing in FlexLearn because I feel it’s very convenient to write in there.”
(Student 6)*

Overall, the theme of structured collaboration reaffirmed the quantitative findings by highlighting students’ perceived growth in organising arguments and reasoning through dialogue. The prominence of the empathy and respect theme also affirms that dialogic pedagogy extends beyond academic skill-building, cultivating ethical and interpersonal competencies crucial for character development. Besides, by using thematic analysis, this study not only quantified the impact of the TTA e-module but also captured the qualitative richness of student experiences, thereby offering a holistic understanding of how technology-enhanced, dialogic instruction supports literacy and character development. In conclusion for this third theme is it offers a nuanced perspective on the e-module’s effectiveness. While students generally found the learning environment engaging, the findings also underscore the importance of explicit facilitation strategies to ensure equitable participation in digital peer work. This has pedagogical implications for future module enhancements, suggesting the need for clearer peer-feedback guidelines and digital citizenship training.

Therefore, the findings of this study support the efficacy of the Thinking-Together Approach (TTA) e-module as a powerful tool for enhancing both argumentative literacy and elements of character development among tertiary-level students in a technology-mediated language learning environment. The significant improvement in the experimental group's post-test writing scores, combined with qualitative evidence of enhanced peer interaction and ethical engagement, aligns with the core goals of dialogic pedagogy and socio-cognitive learning theory. In addition, the results of the study differ from existing research by uniquely integrating the Thinking Together Approach by Kuhn et al. (2017) into a technology-enhanced e-module specifically designed for tertiary education, a context often overlooked in argumentation studies that typically focus on younger learners. Unlike prior work that treats argumentation as a standalone skill, this study emphasises empowering students through sustained, structured dialogic interactions embedded in digital learning environments, fostering not only argumentative literacy but also critical thinking, collaboration, and metacognitive awareness.

This study reinforces the argument that technology-enhanced dialogic learning can serve as a meaningful vehicle for improving higher-order language skills. Students exposed to the TTA e-module not only produced better-structured essays but also demonstrated greater depth in argumentation. These outcomes suggest that scaffolded peer interaction, facilitated by digital platforms, can bridge cognitive gaps and encourage reflective thinking, key components of advanced literacy.

Beyond academic gains, the study also reveals how structured digital dialogues contribute to character-building outcomes, particularly in fostering empathy, respectful communication, and collaborative responsibility. As students engaged in peer feedback and joint reasoning, they practised skills often associated with ethical communication, such as listening actively, negotiating ideas, and resolving differences constructively. These findings resonate with Mercer and Howe's (2012) emphasis on the "educational value of exploratory talk" in nurturing both cognitive and social development. Unlike earlier studies that focused primarily on cognitive outcomes or academic performance (e.g., Felton et al., 2022; Kuhn et al., 2017), this study highlights how a technology-enhanced dialogic framework can simultaneously cultivate socio-emotional competencies, one of the aspects that often underrepresented in traditional argumentation research.

In addition, the use of the ADDIE model in developing the TTA e-module ensured that the intervention was systematic, user-informed, and pedagogically sound. By grounding each phase of module development in learner needs and cognitive objectives, the design process allowed for a highly contextualised and adaptive learning experience. The model's iterative nature also enabled responsive adjustments based on formative feedback during the implementation phase, which likely contributed to the module's success.

However, the qualitative data also reveal areas for refinement, particularly in facilitating equitable participation in peer collaboration and improving training on giving constructive feedback. These challenges point to the need for more explicit instruction on digital etiquette and collaborative norms, especially in asynchronous online environments.

While the results are promising, several limitations must be acknowledged. The quasi-experimental design lacked random assignment, which may introduce selection bias despite

comparable pretest scores. Additionally, the study was limited to one institution and a specific academic context, which may affect generalisability.

Future research could explore the application of the TTA e-module across different cultural or disciplinary settings or investigate its integration with AI-supported writing tools to personalise feedback further. Longitudinal studies might also assess the sustained impact of dialogic writing interventions on students' academic trajectories and character development.

CONCLUSION

In conclusion, this study demonstrates that a technology-enhanced Thinking-Together Approach (TTA) e-module can significantly improve students' argumentative writing skills while also fostering ethical collaboration and reflective thinking. By integrating a technological framework with active, peer-driven discussions, the e-module provides students with opportunities to engage in discussion and refine their writing in a collaborative environment. Through structured interactions, learners not only enhance their argumentative abilities but also develop essential skills such as problem-solving, reasoning, and the ability to construct logically coherent arguments. These elements are vital in the academic and professional spheres, where effective communication is paramount.

Moreover, the TTA e-module promotes ethical collaboration, ensuring that students learn to engage with one another respectfully, acknowledge differing perspectives, and contribute constructively to group discussions. This emphasis on respectful interaction is grounded in socio-constructivist theory (Vygotsky, 1978), which posits that learning is socially mediated and that cognitive growth occurs through collaborative dialogue within the Zone of Proximal Development. Furthermore, the notion of dialogic teaching (Alexander, 2020) supports the idea that structured, respectful exchanges foster not only knowledge construction but also the development of moral and interpersonal responsibility. By embedding these principles, the TTA e-module cultivates an environment where students develop both academic competencies and ethical dispositions essential for lifelong learning.

These practices encourage a deeper understanding of the importance of intellectual integrity and the role of empathy and mutual respect in academic discourse. As students collaborate and reflect on their work and the work of their peers, they begin to internalise values that transcend mere academic achievement. The ability to collaborate ethically also prepares students for future work environments where teamwork and diverse perspectives are critical to success.

Furthermore, the reflective thinking component of the e-module allows students to critically evaluate their own writing, identify areas for improvement, and consider alternative viewpoints, fostering lifelong learning skills. The cyclical nature of reflection, discussion, and revision cultivates an ongoing process of self-assessment and improvement, which is essential for academic growth and personal development.

These findings contribute meaningfully to ongoing discussions on how technology can be harnessed not only for language instruction but also for the holistic development of students. By incorporating digital tools that encourage both intellectual and moral development, educational systems can better prepare learners for the complexities of the modern world. The TTA e-module serves as a model for integrating technology in a way that enhances both

the cognitive and ethical dimensions of student learning. In doing so, it underscores the potential for technology to play a transformative role in education, ensuring that students are not only competent in their academic disciplines but are also equipped with the critical thinking and ethical collaboration skills required for success in a rapidly changing global society.

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APPENDICES

Appendix 1: Pretest of Students' Argumentative Writing Text

9	I disagree with the statement because physical classrooms create a face-to-face environment for students and teachers. It also a classroom set-up where everyone can communicate with each other and engage. A physical classroom has different materials and furniture materials and furniture in them. For illustration, projection screens, boards, teachers, class monitors and more. Besides that, many of the elements in a physical classroom bring positivity and concentration to students regarding studies.
15	
14	Furthermore, there are advantages and disadvantages to both types of classes.
3	Online classes offer convenience and flexibility, as students can learn from anywhere and at any time. Online classes often provide a greater variety of course offerings and can save students money on transportation and housing costs. Additionally, online classes can provide greater accessibility for students with disabilities or who live in remote areas.
3	
35	
1	
	On the other hand, face-to-face classes offers the benefit of in-person interaction, which can facilitate together. This builds up their team working and team-building skills. Students can brainstorm ideas amongst each other as well as get feedback from others. Moreover, in face-to-face learning ensures a better understanding and recollection of lesson content and gives class members a chance to bond with one another. Without much ado, face to face learning is beneficial for collaborative learning because it promotes active students.
	In addition, face-to-face classes is one of the most common methods used to teach new skills and it has been long known that this method is more beneficial than other approaches. A face-to face discussion allows the teachers to easily identify the students understanding of a topic and can then correct them at once. Teachers can explain difficult things in depth, giving students all of the details they need to better understand it. In class, people often distracted by so many things going on.
	In Conclusion, my aim to write this article is to tell you how face to face classes are inefficient compared to online classes. Finally, I think it is very important for us students to change face-to-face learning.
	PA = 2 SB = 2
	AK = 1
	6 = 0

Appendix 2: Post-Test of Students' Argumentative Writing Text

The rapid advancement of technology has significantly transformed the landscape of education, leading to the widespread adoption of online learning platforms. While this mode of education offers numerous benefits, it also poses unique challenges. One such challenge ~~also poses unique challenges~~ is the lack of sufficient break between classes as compared to traditional classroom settings.

Besides, online learning places distinct demands on students. Unlike traditional classrooms, online learners are required to navigate various digital tools and platforms, engage in self-directed learning and manage their time effectively. These demands necessitate longer breaks to alleviate mental fatigue and allow for adequate rejuvenation. $\therefore$ SD

Furthermore, research indicates that the brain's cognitive processing and information retention are significantly enhanced when learners are given ample time to reflect and consolidate their learning. Longer breaks can provide students with the opportunity to review their notes, integrate newly acquired knowledge and engage in critical thinking. Moreover, traditional classrooms foster social interaction and collaboration among students. Online learners often miss out of these valuable opportunities. For instance, longer breaks can provide time for students to connect with peers through virtual platforms, fostering meaningful discussions and enhancing the sense of community. $\therefore$ SD

Additionally, each learner has unique needs and learning styles. Providing longer breaks acknowledges the diverse requirements of students. Some learners may need more time to process information while others may require additional breaks to accommodate personal commitments. Subsequently, adapting to these needs through longer breaks can enhance overall engagement and academic success. $\therefore$ SD

In conclusion, online learners should be granted longer breaks between classes to address the unique challenges. Longer breaks promote cognitive processing and retention ~~and~~, support physical and mental well-being. $\therefore$ AA

FA = 1, R = 2, AA = 4, SD = 3

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