

CHAPTER 4

RESULTS

In this chapter, both quantitative and qualitative data collected from participants responses to the pre- and post-oral presentation tests, learning portfolios, reflective journals, and semi-structured interview were analyzed and presented to answer the three research questions.

4.1 Effects of HOTS-based tasks on students' critical thinking skills

The first research question aimed to discover whether HOTS-based tasks caused positive effects on students' critical thinking skills. The quantitative data collected from pre- and post- oral presentation tests with 30 participants were analyzed to demonstrate the students' critical thinking improvement. Besides, the qualitative data collected from students' transcripts of pre- and post-oral presentation tests and reflective journals were also analyzed to illustrate students' critical thinking developmental process.

4.1.1 Overview of students' critical thinking skills

4.1.1.1 Pre-and post-test results from oral presentations

For critical thinking skills, after participating in the training, students' scores from pre-test and post-test were gathered and analyzed to discover whether there was any significant enhancement. A Paired Samples t-Test was used for the analysis, and the mean scores along with the statistical results were presented in Table 4.1.

Table 4.1 Results of Paired Samples t-Test of students' critical thinking scores

		<i>M</i>	<i>SD</i>	<i>t</i> (30)	<i>p</i>	<i>Cohen's d</i>
Critical thinking	Pre-test	-3.62121	1.35226	-15.383	.000	2.68
	Post-test					

Generally, as shown in Table 4.1, the numbers illustrated a significant improvement in the scores of critical thinking from the pre-test to the post-test. Post-test showed a robust enhancement in critical thinking with a mean difference of -3.62121 and a standard deviation of 1.352, $t(30) = -15.383$, $p < .001$. The effect size was large (Cohen's $d \approx 2.68$), demonstrating a strong impact of the intervention. Such results demonstrated the successful training program with HOTS-based tasks for students' critical thinking improvement.

4.1.1.2 Insight from students' reflective journals

The line graph (Figure 4) derived from students' reflective journals illustrated the improvement of critical thinking skills across three learning stages: before Presentation 1 (before training), after Presentation 1 (after training for Topic 1) and after Presentation 2 (after training for Topic 2). The trend demonstrated a positive improvement over time, confirming that consistent engagement with HOTS-based tasks could improve students' critical thinking skills. Notably, the average critical thinking score was around 4.0 before the first presentation. After the first presentation, the mean score rose to around 6.0. This upward trend continuously reached nearly 8.0 after the second presentation.

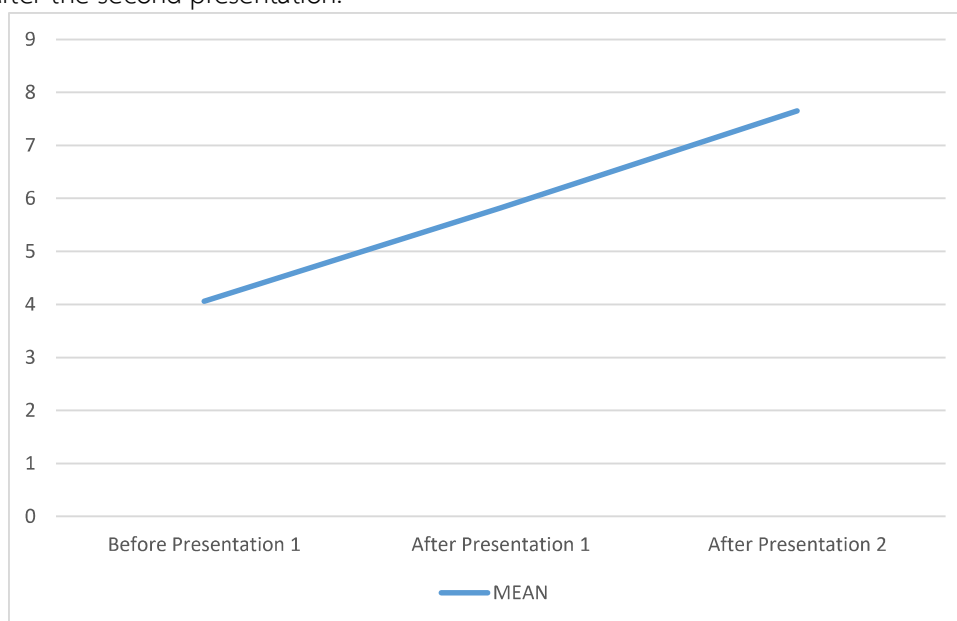


Figure 4.1 Students' critical thinking improvement after engaging with HOTS-based tasks

4.1.2 Improvements in analyzing skills

4.1.2.1 Pre-and post- test results on analyzing skills

The results of Paired Samples t-Test analysis in Table 4.2 revealed an improvement in analyzing scores from the pre-test to the post-test (mean difference = -1.25758 and a standard deviation of 0.45, $t(30) = -15.96$, $p < .001$). The effect size was large (Cohen's $d \approx 2.78$), demonstrating positive improvement in students' analyzing skill after the intervention. These results indicated that HOTS-based tasks significantly influenced the students' analyzing skill as reflected via meaningful effect.

Table 4.2 Results of Paired Samples t-Test of students' analyzing scores

		<i>M</i>	<i>SD</i>	<i>t</i> (30)	<i>p</i>	<i>Cohen's d</i>
Analyzing	Pre-test	-1.25758	.45279	-15.955	.000	2.78
	Post-test					

4.1.2.2 Transcript-based evidence of analyzing skills

Regarding students' analyzing skills, extracts of S3 below show how students analyzed and used the information in the pre- and post-oral presentations.

(S3) Pre-test: *"Moreover, incorporating technology can make learning more engaging; gamified learning experiences and interactive tools have been shown to boost student motivation and participation. Additionally, modern workplaces require digital literacy and adaptability. By integrating technology in the classroom, students develop essential skills such as information management, collaboration, and creativity, which prepares them for future professional environments."*

In the pre-test transcript of S3, the content consisted mostly of disjointed listings of ideas. Particularly, the ideas did not explain how technology integration enhanced student motivation, participation, and the development of digital literacy skills - competencies essential for future workplaces. This reflected a general information gathered only with the simple combination of given sources 1 (how future technologies will transform society, detailing both positive and negative general effects) and 8 (how technology enhances accessibility, inclusivity, engagement, collaboration, and essential skill development in education).

(S3) Post-test: *"Next, technology enables educators to personalize learning materials and adapt tasks to the needs and preferences of the individual student. ... By using technology in education, students gain skills in digital literacy, ... make them more attractive to future employers and increase their job prospects. For example, Digital libraries or online databases ... Content like e-books, scholarly articles, journals, and multimedia clips ... Or Educational platforms and learning management systems (LMS) ... Moreover, Connect Classroom Learning to the Real World. ... foster critical thinking ... preparing them for future problem-solving and career decision-making ..."*

However, the student's performance in the revised post-test transcript demonstrated an improvement in "analyzing" domain. Building upon a general idea regarding the role of technology in enhancing learning motivation and participation, the student narrowed the focus to the point of *"personalized learning*

materials.” By drawing connections between specific digital tools such as “*digital libraries*”, “*educational platforms*”, and “*learning management systems (LMS)*”, the student clarified how these components supported the broader aim of “*preparing students for success in the modern workforce*”. This shift reflected the student’s improved capacity to differentiate - specifically to distinguish and select relevant from irrelevant information within the broader theme of educational technology integration in the given sources 1, 8.

After engaging with HOTS-based tasks, students demonstrated an improvement in analyzing skills when they structured more persuasive arguments. They improved their general argumentations from giving general descriptions of technology in education to utilizing more comparative analysis. This analytical shift indicated progress in analyzing multiple perspectives from sources rather than merely presenting general information.

4.1.2.3 Students’ perceptions from semi-structured interviews on analyzing skills

From the semi-structured interview, the students revealed that the following subskills relating to analyzing ability were improved. They are (1) identify how ideas are connected, (2) recognize the paragraph organization, (3) memorize background information, (4) select the relevant evidence, (5) comprehend reading materials, (6) create better arguments, and (7) value diverse opinions.

Specifically, concerning (1) identifying how ideas are connected, through HOTS-based tasks, students were familiar with discriminating relationships between concepts, directly contributing to the understanding of complex texts.

(S4) “Before the course, I struggled to identify relationships between ideas. However, after that, I improved my ability to identify how different ideas are linked within texts. Through the tasks, I became familiar with distinguishing relationships between the key points, which helped me understand complex texts.”

In respect of (2) recognizing the paragraph organization, the students gradually developed their ability in identifying paragraph structures for topic sentence, supporting sentences, and concluding sentences. Consequently, the students’ speaking coherence was enhanced. Such organizational awareness was completely vital for students’ constructing well-structured arguments.

(S2) “I gradually developed my ability to identify paragraph structures, including the topic sentence, supporting sentences, and concluding

sentence. Specifically, I was weak in recognizing structured paragraphs. After the experience, I enhanced understanding and usage of paragraph organization."

Regarding (3) memorizing background information, HOTS-based tasks engagement assisted students in accumulated pertinent background information, building up a solid foundation for critical interpretations.

(S7) "Before engaging with the tasks, I struggled to retain essential background information, which limited my ability to understand complex concepts. However, as I continued to work on these tasks, they helped me accumulate relevant information more effectively. This experience built a good foundation for me, enhancing my critical interpretations."

For (4) selecting the relevant evidence, students reflected their adaptation at choosing relevant and credible evidence to support their convincing arguments, building critical component of persuasive speech.

(S8) "Before experiencing the tasks, I had difficulty choosing appropriate and credible evidence for my arguments. Through these tasks, I learned to select relevant and credible evidence more effectively, which has been crucial for enhancing my persuasive speech abilities."

With reference to (5) comprehending reading materials, HOTS-based tasks challenged students to deeply engage with texts, leading to gradual understanding in interpreting complicated materials. Such engagement promoted active reading strategies and critical analysis.

(S6) "Initially, I struggled with understanding complex reading materials. However, engaging deeply with the tasks challenged me to improve, leading to a gradual enhancement in my ability to understand and interpret complicated texts."

For (6) creating better arguments, during the training, students learned to select and construct convincing arguments for their debating speeches.

(S1) "From the beginning, I was unable to formulate convincing arguments. During the course, I learned how to select and construct convincing arguments for my debates, significantly improving my skills in expressing arguments convincingly."

Finally, respecting (7) valuing diverse opinions, the students exposed to diverse perspectives through not only HOTS-based tasks but also the opposing viewpoints with arguments in reading materials.

(S3) *“Before joining the course, my exposure to and appreciation for opposing viewpoints was limited. Through the tasks and diverse reading materials, I was exposed to multiple perspectives, which greatly enhanced my appreciation and understanding of different viewpoints.”*

4.1.3 Improvements in evaluating skills

4.1.3.1 Pre-and post test results on evaluating skills

Statistical analysis using the Paired Samples t-Test in Table 4.3 revealed a significant improvement in scores from the pre-test to the post-test, with mean difference = -1.25758 and a standard deviation of 0.45, $t(30) = -15.96$, $p < .001$. The effect size, calculated as Cohen’s d , was approximately 2.78, demonstrating a very large impact. The average improvement in scores after the intervention showed that the HOTS-based training program had a positive impact on students' evaluating skills.

Table 4.3 Results of Paired Samples t-Test of students' evaluating scores

		<i>M</i>	<i>SD</i>	<i>t</i> (30)	<i>p</i>	<i>Cohen's d</i>
Evaluating	Pre-test	-1.25758	.45279	-15.955	.000	2.78
	Post-test					

4.1.3.2 Transcript-based evidence of evaluating skills

A comparative analysis between the pre- and post-test transcripts of S6 revealed an improvement in his evaluating skills.

(S6) Pre-test: *“The first reason is it is because technology provides customized learning experiences. ... While some students learn things quickly, some need more time to comprehend the materials. Some students enjoy doing many exercises, while some do not ... great. ... take advantage of technology to customize their own learning space in accordance to their needs and interests, hence ... learn at their own pace and not fall behind their peers.”*

In the pre-test transcript, he relied on his personal viewpoints and mainly focused on the advantages of customized learning. However, the ideas remained abstract. In contrast, in the post-test transcript, he demonstrated a growth by restructuring his arguments with proper citations. This transformation indicated

progress in the “*checking*” and “*critiquing*” subskills of the evaluating category, as student began to consider the credibility of sources and the strength of arguments.

(S6) Post-test: *“The first reason is it is because technology provides customized learning experiences. ... While some students learn things quickly, some need more time to comprehend the materials. Some students enjoy doing many exercises, while some do not. ... take advantage of technology to customize their own learning space in accordance to their needs and interests, hence ... learn at their own pace and not fall behind their peers. It is fun to learn how one wishes to learn and when fun is present, learning is more effective. A study at Archbishop Williams High School and the Technical University of Denmark ... 97% of 149 students felt gamified simulations ... content more engaging.”*

The post-test transcript contained personal evaluations when incorporating adjectives such as “*fun*” and “*effective*” to evaluate the emotional impact of joy on learning effectiveness. This shift marked an improvement in critiquing. He, furthermore, moved beyond superficial judgment by supporting his claims with empirical evidence from source 3 (classroom technology can boost students’ deeper engagement, personalized learning, collaboration and teamwork, real-world readiness, accessibility and flexibility) - citing specific studies from institutions such as Archbishop Williams High School and the Technical University of Denmark. These examples demonstrate his improving ability to evaluate the persuasiveness and reliability of information by verifying claims with real-world data, assessing whether the data supports his arguments, and ensuring logical consistency in his reasoning.

4.1.3.2 Students’ perceptions from semi-structured interviews on evaluating skills

The following data were the students’ personal viewpoints on the improvement of evaluating subskills after the training: (1) value credibility of sources, (2) compare solutions, (3) argue with logical reasoning, and (4) engage with personal critical thinking.

Particularly, for (1) valuing credibility of sources, students especially focused on the criteria of up-to-date information, the articles and the authors’ fame for initial evaluation.

(S4) *“Before the course, I often judged the credibility of sources based on my personal feelings. Through the tasks, I learned to assess sources by checking up-to-date information, the authors’ title, and the*

publication platforms. Now, I appreciate the importance of a comprehensive evaluation, including the author's expertise and the publication context."

Regarding (2) comparing solutions, the students oriented themselves to evaluate the solutions. They subsequently make comparison among the selected solutions for multi-aspect considerations in terms of the practicality and sustainability.

(S2) "Previously, I focused only on the collected solutions without any considerations. The course taught me to evaluate the logic and scrutinize the possibility of proposed solutions. Now, I regularly compare solutions from different sources and adjust or select alternatives for more effective outcomes."

Concerning (3) arguing with logical reasoning, students tended to prefer opposing viewpoints with logical reasons. They believed that such kinds of argumentation might contribute significantly to their objective argument.

(S3) "Before, I passively accepted arguments and was easily influenced by seemingly reasonable viewpoints without questioning their coherence. Through the course, I learned to prefer arguments that are supportive by logical reasoning to develop my objective argumentation. Now, I've become better at critiquing and thinking systematically, recognizing biases, and questioning the reliability of data and the objectivity of arguments."

Finally, regarding (4) engaging with personal critical thinking, students were boosted to practice expressing their personal viewpoints, critiquing friends' perspectives with critical questions, reliable evidence, and opposing perspective appreciation.

(S11) "Through the course, I was encouraged to express my viewpoints critically, raise various questions and appreciate diverse perspectives. I now analyze documents better, via the research methods and data verification for scopes of issues and clearly arguments."

4.1.4 Improvements in creating skills

4.1.4.1 Pre- and post test results on creating skills

Statistical analysis shown in Table 4.4 showed a significant improvement in scores from the pre-test to the post-test, with a mean difference of -1.10606 and a standard deviation of 0.53, $t(30) = -12.06$, $p < .001$. The effect size was large (Cohen's $d \approx 2.10$), showing a strong influence of the intervention on students'

creative skills. These numbers claimed that the training course enhanced students' creating skills.

Table 4.4 Results of Paired Sample t-Test of students' creating scores

		<i>M</i>	<i>SD</i>	<i>t</i> (30)	<i>p</i>	<i>Cohen's d</i>
Creating	Pre-test	-1.10606	.52675	-12.062	.000	2.10
	Post-test					

4.1.4.2 Transcript-based evidence of creating skills

To illustrate, a comparison of pre- and post-tests' transcripts from S12 illustrated an improvement of "creating" in students' argumentation.

(S12) Pre-test: *"In conclusion, while technology plays a significant role in modern education A balanced approach that leverages the benefits of technology while addressing its challenges is essential. ... create an educational environment that prepares students for the future, equipping them with both technical skills and critical thinking abilities"*

In the pre-test transcript, the student relied mainly on personal thinking and intuitive responses when addressing issues of technology in education. As observed in the transcript, he demonstrated weak ability in proposing solutions. Specifically, he offered general strategies for integrating technology and outlined broad visions for general building a future-ready educational environment. These ideas remained largely at the surface level. The proposed solutions, though relevant and well-intentioned, did not reflect the creating level. Rather than identifying specific technological tools, pedagogical frameworks, or contextual constraints, students provided broad suggestions such as *"use more technology"* or *"make learning more innovative,"* lacking clear justification and evidence-based support.

(S12) Post-test: *"In conclusion, while technology undeniably brings numerous benefits to education ... Ultimately, the key lies in integrating technology thoughtfully and purposefully into Vietnamese education. By doing so, we can harness its advantages while mitigating its downsides, creating a more inclusive and effective learning environment for Vietnamese students. As we move forward in this digital age, let us strive to use technology as a powerful tool to enhance education, preparing Vietnamese students for the challenges and opportunities of the future ...!"*

However, in the pot-test transcript, the same student demonstrated a dramatical improvement in creating skills, where his supporting sentences were newly generated arguments from existing materials and paraphrasing techniques. Furthermore, he also reorganized the content with creative insights. The student gradually transitioned from surface-level reproduction of information to thoughtful application of knowledge, which was crucial for creating skills. Particularly, the student proposed a balanced approach to integrating technology into education, as seen in the statement: *“Ultimately, the key lies in integrating technology thoughtfully and purposefully into Vietnamese education.”* This reflected the planning subskill, where the student formulated a practical and strategic direction for addressing educational challenges, especially in this case by designing how technology should be implemented. Furthermore, in the sentence *“By doing so, we can harness its advantages while mitigating its downsides, creating a more inclusive and effective learning environment for Vietnamese students,”* student proposed actionable solutions that demonstrated a problem-solving mindset, illustrating the producing subskill.

This transition from analysis to solution indicated the student's ability to construct a coherent response that aligns with real-world applications. Importantly, before concluding the presentation, the student shifted to hypothesizing about future educational trends with the statement: *“As we move forward in this digital age, let us strive to use technology as a powerful tool to enhance education, preparing Vietnamese students for the challenges and opportunities of the future.”* This vision demonstrated the generating subskill, as the student created a personal hypothesis about long-term impacts, guided by an imaginative mindset. Together, these elements illustrated the student's improvement in creating skills, moving beyond paraphrasing the existing viewpoints to actively constructing creative content with context-specific arguments.

The findings of this part highlighted a notable improvement in students' creative skills, particularly in how they concluded their presentations. Students demonstrated the ability to integrate personal hypotheses into specific scenarios, showing a more flexible and innovative use of ideas. These creative conclusions did not merely summarize prior content but introduced new lines of reasoning, drawing the audience's attention to new perspectives and reinforcing the speaker's final message. Therefore, the application of HOTS-based tasks demonstrated positive influences on students' creative abilities' enhancement.

4.1.4.3 Students' perceptions from semi-structured interviews on creating skills

From the students' responses through the semi-structured interview, the emerged were classified into three subskills of their creating improvement: (1) solve problems based on practical solutions, (2) justify ideas with evidence, and (3) value opposing perspectives.

For (1) solving problems based on practical solutions, the students concentrated on offering solutions to fit specific contexts with targeted audiences and clear limitations. Furthermore, they also oriented themselves to create their own solutions based on the consideration of feasibility, long-term influences, and alternative approaches. From such practice, students' critical thinking improved from general thinking to root cause, from surface-level solutions to more effective and contextualized ones.

(S1) "Before the course, I didn't have a habit of presenting my own viewpoints or solutions. Through the course, I learned to claim solutions to fit specific contexts, considering feasibility, long-term impacts, and alternative approaches, which helped me identify root causes and symptoms more critically. Now, I adjust solutions to be context-appropriate, considering the situation, target audience, and potential impacts, making my solutions more effective and applicable."

Concerning (2) justifying ideas with evidence, the students tended to support their arguments with evidence by using statistics and real-world examples instead of personal explanation. Furthermore, they adapted solutions to ensure the feasibility and the appropriateness of local social, economic and cultural settings. In this flow, they gradually learned to compare multiple solutions. They weighed pros and cons for identifying more practical alternatives.

(S4) "Previously, I would make arguments based on my personal viewpoints. After the course, I realized that every argument must be supported by evidence. I started supporting my arguments with evidence, using statistics and real-world examples. This has deepened my understanding and enhanced the credibility of my arguments."

With reference to (3) valuing opposing perspectives, the students developed their acknowledging via integrating opposing viewpoints. Specifically, they referred counterarguments to strengthen their independent reasons. These explained

subskills highlighted the progression from personal reasons to arguments with selective evidence, demonstrating the positive influences of HOTS-based tasks on fostering critical solutions and multiple perspective engagement.

(S5) *“At the beginning, I used to accept opinions passively and didn't consider opposing viewpoints much. The course encouraged me to integrate opposing views and strengthen my independent reasoning. I now actively find and respect different viewpoints, which enriches my critical thinking and enhances the depth of my arguments.”*

Based on the presented data including students' scores from pre- and post-oral presentation tests, their self-reflected scores from reflective journals, and their perceptions of HOTS-based tasks application from semi-structured interview, the analysis revealed from both quantitative and qualitative data that HOTS-based tasks effectively contributed a positive influence on students' critical thinking skills, particularly in the domains of analyzing, evaluating, and creating.

4.2 Effects of HOTS-based tasks on students' public speaking performance in terms of content quality and language use

The second research question focused on investigating whether HOTS-based tasks positively influence students' content quality and language use. To answer this question, students' 30 oral presentations from pre- and post-tests were obtained to quantitatively measure improvements in content quality and language use. Moreover, students' presentation transcripts were used to qualitatively explore the progress in depth.

4.2.1 Improvements in content quality

4.2.1.1 Pre- and post- test results on content quality

For content quality, the content of students' English Public Speaking tests was examined by a Paired Samples t-Test to determine the level of content quality improvement. The numbers for the pre- and post-intervention tests were shown in Table 4.5.

Table 4.5 Results of Paired Samples t-Test for students' content quality

	<i>M</i>	<i>SD</i>	<i>t</i> (30)	<i>p</i>	<i>Cohen's d</i>
Content quality Pre-test	-3.93939	1.46713	-15.425	.000	2.68
Post-test					

As illustrated in Table 4.5, the Paired Samples t-Test analysis revealed a significant improvement in scores from the pre-test to the post-test, a mean difference of -3.93939 and a standard deviation of 1.47, $t(30) = -15.43$, $p < .001$. The effect size was very large (Cohen's $d \approx 2.69$), demonstrating a strong influence of the intervention on students' content improvement. These results indicated that HOTS-based tasks were effective in enhancing students' content quality in oral presentations.

Table 4.6 Results of Paired Samples t-Test for students' content quality scores

		<i>M</i>	<i>SD</i>	<i>t</i> (30)	<i>p</i>	<i>Cohen's d</i>
Introduction	Pre-test	-.89394	.40998	-12.526	.000	2.18
	Post-test					
Body	Pre-test	-1.13636	.43791	-14.907	.000	2.59
	Post-test					
Conclusion	Pre-test	-.83333	.44488	-10.761	.000	1.87
	Post-test					
Overall presentation	Pre-test	-1.07576	.48608	-12.714	.000	2.21
	Post-test					

The SPSS data presented in Table 4.6 illustrated significant differences in content quality improvement between pre-test and post-test, with post-test consistently outperforming across all measured sections: Introduction, bodies, and conclusion. Specifically, introduction ($t(30) = -12.53$, $d \approx 2.18$), body ($t(30) = -14.91$, $d \approx 2.59$), conclusion ($t(30) = -10.76$, $d \approx 1.87$), and overall presentation quality ($t(30) = -12.71$, $d \approx 2.21$), with all p -values less than .001. These large effect sizes confirmed the significant influences of HOTS-based tasks on students' content quality.

4.2.1.2 Structural improvements in presentation: Introduction, body, and conclusion

4.2.1.2.1 Introduction part

Besides quantitative data, an analysis of students' pre- and post-oral presentation transcripts revealed significant improvement in their ability to structure and develop content across the three key components: introduction, body, and conclusion.

(S4) Pre-test: "Good day everyone. My name is ..., I will delve into the question, Should Education depend on technologies? When it comes to technology, I appreciate ... traditional classrooms, characterized by books, pens, a board, chalk, and the voices of teachers, and modern classrooms, ... where professors ... use projectors to enhance a laptop screen ... students use smartphones or laptops to

play Kahoot in class. In other words, I am fortunate to live in an era where people can witness how technology is transforming education.”

Concerning the introduction, the pre-test transcript of S4 revealed that while the student included a hook and some connecting information, the section lacked a thesis statement. Instead of presenting a distinct personal viewpoint, the student reused the assignment prompt almost verbatim, resulting in a generic opening that failed to establish a clear argumentative speech. Moreover, although the hook and connecting information were presented, their functions were not fully exploited. The ideas lacked intentional flow, making it difficult for the audience to grasp the direction of the upcoming content in the bodies.

(S4) Post-test: “I am fortunate to live in an era where people ... witness how technology is transforming education. ... allows us to easily access the treasure trove of human knowledge at our fingertips. Moreover, by utilizing technology, students gain essential skills in digital literacy. Therefore, education ... increasingly reliant on technology. However, in my point of view, education should not depend on technology. I’ll explain my point by delving into 3 main ideas ... negatively impact students’ physical and mental health, ... lead to distractions, ... lose traditional skills.”

In contrast to the weaknesses observed in the pre-test transcript, the introduction in post-test one demonstrated noticeable improvement in the structure. The student crafted a hook that contextualized the topic within the intersection of education and technology, effectively engaging the audience with a relevant and thought-provoking point. Additionally, the connecting information was developed as the student flexibly integrated two key themes, online material exposure and digital literacy skills, before articulating her personal viewpoint. Most importantly, the presence of a clear thesis statement in the transcript represented a significant advancement. Although the three main points in the thesis statement were not yet fully cohesive in terms of logical flow, the student showed clear progress in planning and structuring her introduction to serve as a roadmap for the rest of the presentation.

4.2.1.2.2 Body part

Regarding bodies, the bodies were improved in terms of enhanced persuasive arguments within well-structured paragraph organization as illustrated in the extractions. Specifically, in this part, crafting body paragraphs with

clear topic sentences, logically connected supporting sentences, and credible evidence reflected students' mastery of combining analyzing, evaluating, and creating thinking skills after the application of HOTS-based tasks.

(S10) Pre-test: *"The second positive change ... effectiveness. On the one hand, improving the quality of learning and teaching through access to new information ... important benefits. Technology ... easy for students and practitioners to stay up to date with the latest architecture through research, scientific articles, and online resources, ... ensuring the learning process stays abreast of progress in the field. Besides, according to a study conducted by the Sain Mari's university, 92% of teachers said ... using technology in education ... improve their access to content, resources, and materials ... Through search engines such as Google Scholar and electronic libraries ... support effective search and analysis of information results ... helping develop critical thinking. Furthermore, access to online courses, video lessons, and interactive materials ... create a rich learning environment, enhancing the learning experience."*

In the pre-test transcript, the student (S10) demonstrated a focused body paragraph by a well-defined topic sentence, which immediately signaled the main idea - the effectiveness of technology in education. This clear opening allowed the audience to easily grasp the student's communicative intent and anticipate the line of argumentation that followed. The student later developed the supporting sentences with the availability of up-to-date online materials and digital resources, reinforcing the relevance and practicality of technology integration in educational settings to strengthen the argument. For example, the student included a range of examples as well as empirical data from a study conducted by Saint Mary's University to not only enhance the validity of the claim but also demonstrated the student's ability to evaluate and apply external sources to support his idea.

(S10) Post-test: *"The second positive change ... effectiveness. On the one hand, improving the quality of learning and teaching through access to new information ... important benefits. Technology ... easy for students and practitioners to stay up to date with the latest architecture through research, scientific articles, and online resources, ... ensuring the learning process stays abreast of progress in the field. In*

the study of How Teachers Use Technology by Mary Beth Hertz (March 13, 2013) ... as a member of a large online community of educators through Twitter and other social media outlets ... known how much of an impact the Internet ... on educators and their classrooms across the world ... surprised ... 92% of teachers ... Internet has a 'major impact' on their ability to access content, resources, and materials for their teaching. Through search engines such as Google Scholar and electronic libraries ... support effective search and analysis of information results ... helping develop critical thinking. Furthermore, access to online courses, video lessons, and interactive materials ... create a rich learning environment, enhancing the learning experience. Technology ... personalizes work, allowing students ... choose methods and materials ... suit individual needs ... helps teachers monitor each student's learning progress, thereby improving quality teaching."

However, the comparison of pre-test and post-test transcripts revealed a clear content improvement with the support of evidence for better argument. While the student retained the original topic sentence and some supporting points, the post-test transcript reflected an intentional effort to elaborate on key ideas by incorporating additional data and expanding the argument's scope. Specifically, the student strengthened the supporting sentences by complementing the original quantitative reference - a study conducted by Saint Mary's University - with an additional source, Mary Beth Hertz's 2013 study on How Teachers Use Technology. This demonstrated an improved ability to synthesize multiple sources, thereby enhancing the credibility and persuasiveness of the argument. Moreover, the student introduced a new line of benefits by expanding the discussion to the theme of personalized learning, which was widely recognized as an essential educational need in the 21st century. This extraction signaled progress in the student ability to generate, integrate, and extend ideas beyond the original scope.

4.2.1.2.3 Conclusion part

Regarding the conclusion, the students' ability to write conclusions illustrated progress. Students' improvements revealed three key areas including providing restatement of main ideas, offering contributions, and engaging the audience with relevance. Specifically, students showed enhanced ability to concisely restate the main ideas of their work, ensuring coherence. The improvement reflected students' capacity to synthesize complex arguments into short summaries. Specifically,

they provided thoughtful contributions, such as offering relevant suggestions, expressing well-reasoned opinions, or proposing predictions based on their analysis. Moreover, they knew how to engage the audience through meaningful questions or hypotheses or insights that encouraged reflection or further exploration.

(S12) Pre-test: *“In conclusion, ... technology ... a significant role in modern education, ... the sole foundation of learning. A balanced approach ... leverages ... benefits ... addressing ... challenges ... can create an educational environment that prepares students for the future, ... technical skills and critical thinking abilities. Thank you.”*

In the pre-test transcript, the student (S12) delivered a quite relatively well-structured conclusion with two essential functions: restating the main ideas and offering relevant solution. The student proposed a solution that promoted the integration of technology and education while cautioning against excessive dependence. This solution was accompanied by a forward-looking perspective, envisioning an educational environment that not only supported the development of technical skills but also nurtured critical thinking abilities. Despite these strengths, a disconnect existed between the conclusion and the body content of the presentation. While the student emphasized the importance of critical thinking and technology in the conclusion, the body paragraphs did not explore these themes in sufficient depth. As a result, the conclusion somewhat detached from the main argument structure, formulating a signal of inconsistency.

(S12) Post-test: *“In conclusion, ... technology ... numerous benefits to education, ... increased accessibility, personalized learning, ... engagement, ... remain mindful of its potential drawbacks. Issues ... technological disparities, distractions, privacy concerns, and overreliance on digital tools ... a balanced approach. ... integrating technology thoughtfully and purposefully into education. ... harness its advantages while mitigating its downsides... let us strive to use technology as a powerful tool to enhance education, preparing ... challenges ... opportunities of the future. Thank you for your attention.”*

However, in the post-test transcript, the student showed significant improvement in conclusion. Compared to the earlier version, the student revised sentence structures and added meaningful ideas to create a stronger link

between the bodies and the conclusion. These changes helped the presentation end more smoothly with the suggested solution. Another essential enhancement was the removal of the idea "*critical thinking skills*", which made the solution idea more relevant and better connected to the main points discussed in the bodies. Importantly, he also engaged the audience by sharing personal predictions about education in the digital age. This made the conclusion more creative and interesting.

In summary for content quality, an analysis of students' pre- and post-oral presentation transcripts from revealed progress in their ability to structure and create content across three key components of introduction, body, and conclusion. Specifically, after the treatment, the essential content required for each section was understood clearly, and their intended communicative functions were also expressed effectively. Such improvement emphasized the positive impact of HOTS-based tasks on enhancing students' content quality of organizing and presenting ideas systematically for more clarity and coherent presentations.

4.2.1.3 Insight from students' reflective journals

Based on the student's self-evaluation, as presents in the line graph in Figure 5, the students showed consistent improvement in content quality across introduction, body, conclusion, and overall presentation during presentations 1 and 2. Specifically, the mean score was about 5 before the first presentation, demonstrating a moderate level of content quality before the intervention. After completing the first presentation with HOTS-based task, the mean score increased. The upward trend continues after the second presentation with a mean score over 8.0. Overall, a consistent and significant improvement in students' content quality after the intervention was demonstrated.

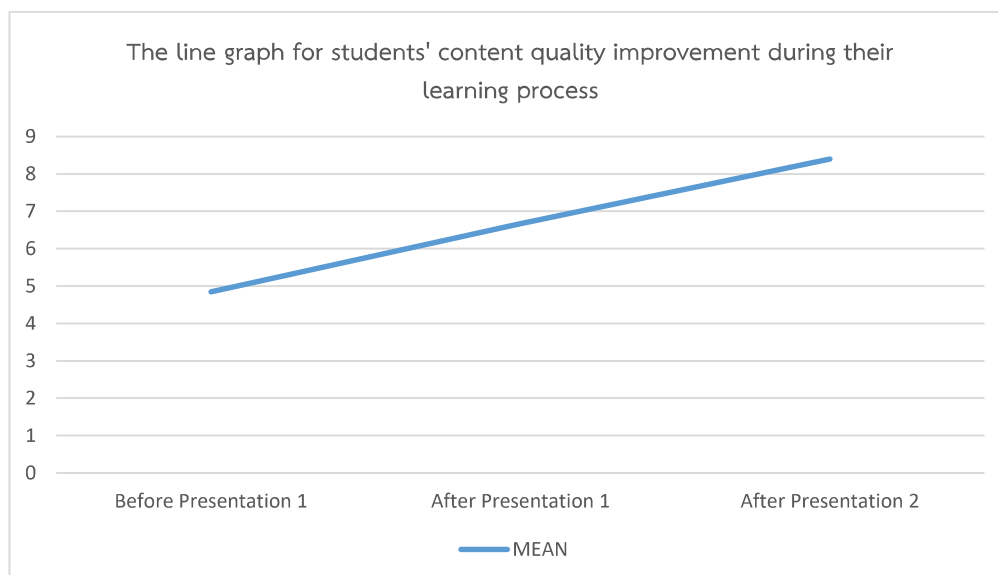


Figure 4.2 The line graph for students' content quality improvement during their learning process

4.2.1.4 Students' perceptions from semi-structured interviews on content quality

Based on the semi-structured interview, three major dimensions of content quality were developed. They knew how to (1) organize better content, (2) argue more competing ideas, and (3) engage audience.

For (1) organizing better content, students improved their structural organization via transitioning from scattered ideas to well-structured presentations with clear sections of introduction, bodies, and conclusion, in which students presented their main ideas clearly with evidence-based arguments.

(S3) *"Before the course, my presentations were disorganized, and my ideas were unconnected. After the course, I learned to structure my presentations effectively, transitioning from unconnected ideas to well-structured formats with clear introductions, bodies, and conclusions with evidence-driven arguments. Now, my presentations are more organized."*

About (2) arguing more competing ideas, students steadily enhanced their reasoning from surface-level to in-depth level, moving from simple personal explanations to critical engagement with topics. Furthermore, students also realized how to balance their argumentation by expressing multiple perspectives instead of

one-sided views only. Moreover, the students tended to improve stronger evidence-based reasoning via using facts, statistics, and real-world examples for supporting arguments.

(S2) *“In the beginning, my arguments were at surface level, often just personal explanations without much depth. The course taught me to enhance my reasoning, improved from simple and personal explanations to critical engagement with topics. I learned to use facts, statistics, and real-world examples to support my arguments and to analyze both positive and negative sides of issues. I now focus on depth in my argumentation, expressing multiple perspectives and strengthening my evidence-based reasoning, which makes my arguments more compelling and balanced.”*

About (3) engaging audience, students’ content delivery was more compelling in the viewpoints and message transformation for engaging audience.

(S4) *“Before, my presentations lacked engagement and were not very compelling. After that, I improved how I deliver content by making it more meaningful. I’ve learned to integrate short clips or reliable data citations to make my presentations provoking and engaging for the audience. Now, my presentations are more persuasive and engaging.”*

These mentioned aspects demonstrated the improvement from surface-level presentations to well-organized, greatly engaged, and persuasive ones. The treatment in this study illustrated the significant influences of HOTS-based tasks on students’ content quality.

4.2.2 Improvements in language use

4.2.2.1 Pre- and post- test results on language use

Concerning language use, students’ progress in this aspect when delivering presentations on a specific topic were evaluated through Paired Samples t-Test analysis. The findings for the pre- and post-training assessments were presented in Table 4.7.

Table 4.7 Results of Paired Samples t-Test for students’ language use

		<i>M</i>	<i>SD</i>	<i>t</i> (30)	<i>p</i>	<i>Cohen’s d</i>
Language use	Pre-test	-2.43939	.87283	-16.055	.000	2.8
	Post-test					

The Paired Samples t-Test analysis shown in Table 4.7 demonstrated a significant improvement in scores from the pre-test to the post-test, with a mean difference of -2.44 and a standard deviation of 0.87, $t(30) = -16.06$, $p < .001$. The effect size was very large (Cohen's $d \approx 2.80$), demonstrating a significant improvement in students' language use. These results showed that the application was effective in enhancing students' language use for presentations.

Table 4.8 Results of Paired Samples t-Test for students' language use scores

		<i>M</i>	<i>SD</i>	<i>t</i> (30)	<i>p</i>	<i>Cohen's d</i>
Vocabulary	Pre-test	-.83333	.34611	-13.831	.000	2.41
	Post-test					
Sentence structure & Grammar	Pre-test	-.83333	.34611	-13.831	.000	2.41
	Post-test					
Intelligibility	Pre-test	-.92424	.41686	-12.737	.000	2.22
	Post-test					

The SPSS data expressed in Table 4.8 strongly highlighted the significant differences in language use between the pre- and post-tests presentations after the application of HOTS-based tasks. Regarding vocabulary, the vocabulary used in post-test presentation was more significant than in pre-test one, as indicated by a mean difference of -0.83 for both vocabulary and sentence structure & grammar ($t(30) = -13.83$, $d \approx 2.41$), and -0.92 for intelligibility ($t(30) = -12.74$, $d \approx 2.22$), all at $p < .001$. These large effect sizes showed that the intervention caused significant influences on students' language use.

4.2.2.1.1 Vocabulary range and appropriateness

Students' vocabulary showed notable improvement, as revealed through the qualitative analysis of pre- and post- oral presentation transcripts.

(S4) Pre-test: "in conclusion, ... overreliance on technology, ... Finally, I believe that technology should serve as a great support tool for teaching and learning rather than a primary dependence in education."

Based on the comparison between both transcripts of student (S4), pre-test transcript primarily featured high-frequency vocabulary, with only a few instances of subject-specific terminology related to the integration of technology in education, such as "overreliance," and "independence in education." While the students' ideas were coherent and relevant, the overall lexical range remained basic. The vocabulary used aligned with perspectives from educational sources 3 (classroom

technology can boost students' deeper engagement, personalized learning, collaboration and teamwork, real-world readiness, accessibility and flexibility).

(S4) Post-test: "In summary, ... Overreliance on technology ... impact physical and mental well-being, ... To achieve a well-rounded education, ... to balance modern study methods with traditional ones. ..."

When analyzing the post-test transcript, the progress in vocabulary use was found. Phrases such as *"physical and mental well-being"*, *"a well-rounded education"*, and *"to balance modern study methods with traditional ones"* reflected a more topic-specific and academically appropriate vocabulary. For example, the sentence *"To achieve a well-rounded education, it's important to balance modern study methods with traditional ones"* showed lexical advancement, aligning with current educational frameworks that advocated for an integrated approach to digital and traditional learning methods from source 3 (classroom technology can boost students' deeper engagement, personalized learning, collaboration and teamwork, real-world readiness, accessibility and flexibility). Similarly, the use of the phrase *"physical and mental well-being"* demonstrated the students' awareness of current scholarly debates and their ability to synthesize ideas across source 1 (the need for balance technological growth and its social and emotional impacts), 4 (deep investment in educational technology can be undermining education), 10 (excessively technological use can negatively impact children's physical, social and cognitive development).

Other selective examples from post-test transcript also reflected students' use of appropriate topic-specific vocabulary. This was evident in the integration of terms such as *"essential skills in digital literacy"*, drawn from provided sources 1 (how future technologies will transform society, detailing both positive and negative general effects) and 3 (classroom technology can boost students' deeper engagement, personalized learning, collaboration and teamwork, real-world readiness, accessibility and flexibility), which emphasized the importance of responsibly integrating technology into the classroom. Additionally, student adopted vocabulary linked to psychological impacts of technology, including *"psychological symptoms"*, a term supported by articles from provided sources 4 (deep investment in educational technology can be undermining education) and 10 (deep investment in educational technology can be undermining education), which highlighted issues like anxiety and loneliness caused by overuse of digital tools. Other precise phrases like *"eye strain, headaches, and disrupted sleep patterns"* also illustrated the health-

related concerns discussed in the source 10, demonstrating that students not only read but also selected and applied relevant vocabulary across disciplines. These collective examples indicated that the students moved beyond passive reading and actively applied vocabulary from multiple credible sources to enrich their own lexical source.

4.2.2.1.2 Sentence structure

Students' sentence structures show an improvement via the qualitative analysis of pre- and post-oral presentation transcripts.

(S2) Pre-test: *"For example, platforms such as Moodle, Canvas, and Google Classroom help teachers organize materials, share resources, and assign homework which creates different learning styles for students to gain knowledge."*

For this sentence in pre-test transcript from S2, the phrase *"which creates different learning styles for students to gain knowledge"* was a relative clause intended to modify the preceding action. However, it was incorrectly attached to *"assign homework,"* leading to a confusing interpretation. The intended meaning seemed to be that using these platforms supported various learning styles, not that homework itself created them. The structure of the sentence with the wrong use of relative clause *"which"* did not clearly express this idea.

(S2) Post-test: *"At the current time, great number of teachers take advantages of some platforms such as Google Classroom and Moodle to teach online, to manage students' learning resources via sharing materials and assigning homework for meeting students' different learning styles."*

The student demonstrated a significant improvement in grammatical accuracy by revising a previous mistake involving the use of a relative clause with *"which."* To modify the sentence's meaning, the student added a prepositional phrase that clarified the time reference and better matched the intended communication. Furthermore, the student transformed the original complex sentence into a simple sentence by using a parallel structure.

(S2) Pre-test: *"And of course, you can't miss out on educational games such as Kahoot!, Quizizz."*

Another example of improvement in sentence structure could be seen in the students' transcript of pre-test. Even though this original sentence was not grammatically incorrect, what stood out was the more effective and sophisticated use of sentence construction in the revised version.

(S2) Post-test: *"Moreover, Kahoot and Quizizz may be the two popular game creating tools used by teachers to foster learning motivation for students in the classes"*

The revised sentence in post-test transcript of S2 used the transition word *"moreover"* to introduce additional information in a cohesive manner. The modal verb *"may be"* was appropriately chosen to express possibility, maintaining an objective tone that was suitable for oral presentation. Additionally, the complex noun phrase *"the two popular game creating tools"* was grammatically well-constructed with good combination of quantity, adjective, and compound noun elements. The sentence also employed a reduced relative clause in the passive voice *"used by teachers"*, which added detail without unnecessary repetition. Furthermore, the purpose clause *"to foster learning motivation"* was concisely stated the intended function of the tools. Overall, the sentence illustrated a strong command of higher level of grammar.

4.2.2.1.3 Grammatical accuracy

Based on the qualitative analysis of pre- and post-oral presentation tests, the students' grammar improved. A comparison of pre- and post-test transcripts of S10 highlighted clear grammatical progress in sentence clarity, punctuation, and coherence.

(S10) Pre-test: *"It's also an opportunity for students to use it to automate tasks like organizing notes, scheduling study sessions, and setting reminders using apps and tools, improving time management such as at HUFIT, we get advice through Moodle but also don't need to get papers from lectures."*

In pre-test transcript, the sentence was long and loosely structured, with multiple ideas joined in a single run-on sentence. The clause *"improving time management such as at HUFIT..."* was grammatically awkward, as it attempted to blend an abstract concept with an unrelated example, leading to confusion. The use of *"and tools"* after *"apps"* also disrupted parallelism slightly.

(S10) Post-test: *“It’s also a chance for students to use it to automate tasks like organizing notes, scheduling study sessions, and setting reminders with apps and tools. This helps improve time management. For example, at HUFLIT, we get advice through Moodle and don’t need to receive papers directly from lecturers.”*

In contrast, post-test transcript broke the content into clearer and well-punctuated sentences, improving readability and logical flow. It separated the explanation of benefits *“this helps improve time management”* from the example *“for example, at HUFLIT...”*, which clarified the relationship between general ideas and specific evidence. Furthermore, phrase such as *“don’t need to receive papers directly from lecturers”* was more grammatically correct than *“don’t need to get papers from lectures”* in pre-test transcript. In conclusion, post-test transcript showed significant grammatical improvement through clearer sentence structure, better punctuation, and more precise use of academic English.

(S10) Pre-test: *“This app is very convenient, which can facilitate collaboration between teacher and students through email, Zalo, etc. They will help them reduce manual effort about manage paper, test and time.”*

Another comparison between the pre- and post-tests transcripts of S10 showed clear grammatical improvement in sentence structure and subject-verb agreement. In the pre-test transcript, the sentence structure contained multiple errors. For example, the phrase *“which can facilitate collaboration...”* was incorrectly linked to *“this app is very convenient,”* resulting in a misplaced relative clause. Additionally, the use of plural pronouns *“they will help them”* was unclear, as it was not obvious what “they” referred to - apps, emails, or something else. The phrase *“reduce manual effort about manage paper, test and time”* was also ungrammatical, combining incorrect preposition use *“about manage”* and inconsistent noun forms.

(S10) Post-test: *“This app is very convenient and can facilitate collaboration between teachers and students through email, Zalo, and other platforms. It helps reduce manual effort in managing paperwork, tests, and time.”*

In contrast, post-test transcript demonstrated significant grammatical refinement. The sentence was properly structured using coordination *“this app is very convenient and can facilitate...”* rather than a misplaced clause. It

also maintained subject-verb agreement, clarified references, and used more precise phrasing-such as “*reduce manual effort in managing paperwork, tests, and time.*” In conclusion, post-test transcripts reflected stronger grammatical control through improved sentence construction, clearer pronoun references, and appropriate verb and noun forms.

In summary for language use, as demonstrated in the scores and extracts from pre- and post-test transcripts, students demonstrated significant progress in their language use of vocabulary, sentence structure and grammar. Particularly, students showed a noticeable decrease in the use of simple sentences and a corresponding increase in compound and complex sentences. The findings also indicated their ability to apply higher level of grammatical rules with much more topic-specific vocabulary to express ideas.

4.2.2.2 Insight from students’ reflective journals

Concerning the mean scores reported in the reflective journals as represented in the line graph in Figure 6, the students demonstrated significant improvement in their language use during oral presentations, particularly in the areas of vocabulary, sentence structure, and grammar. Based on the data, at the beginning, the mean score was slightly below 5.0. However, the scores increased steadily after the first presentation. By the time of the second presentation, the mean score reached above 8.0, demonstrating dramatical progress. Overall, the Figure demonstrated an upward trend in students’ language use after the intervention.

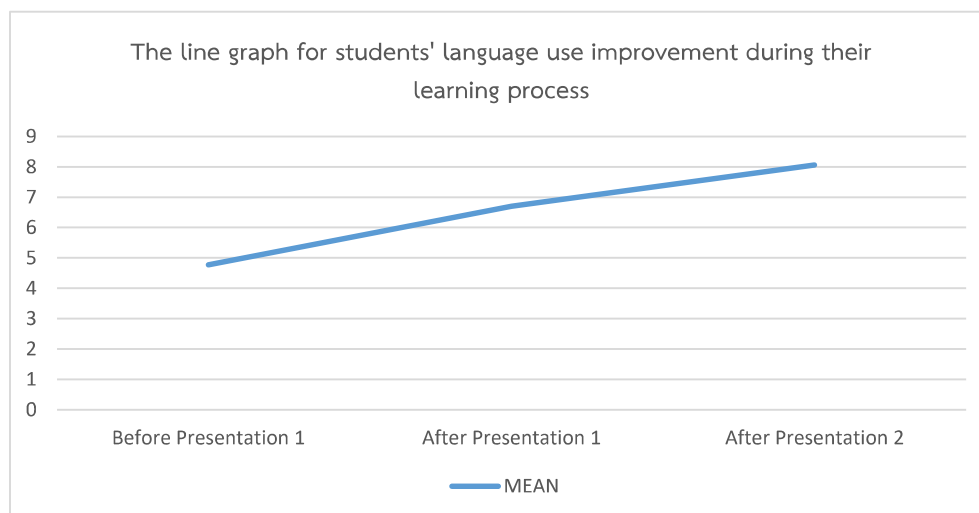


Figure 4.3 The line graph for students' language use improvement during their learning process

4.2.2.3 Students' perceptions from semi-structured interviews on language use

4.2.2.3.1 Vocabulary range and appropriateness

Based on the responses from the semi-structured interview, students showed their vocabulary improvement when they knew how to (1) expand vocabulary source and (2) use appropriate words.

Respecting (1) expanding vocabulary source, students improved their vocabulary source through their exposure of reading, researching, and analyzing materials. During this process, technical terms and abbreviations (e.g., “carbon neutrality,” “nuclear fission,” “pedagogical strategies”) were gradually learned and broadened for the group discussions of presentations 1 and 2.

(S2) *“Before the course, I lacked technical terms and struggled with jargon. During the course, I improved my vocabulary by reading, researching, and analyzing materials related to the topic, such as “carbon neutrality,” “nuclear fission,” and “pedagogical strategies”. Now, I have broader vocabulary that includes specific technical terms, which I confidently use in group discussions and presentations for topics like nuclear power and education.”*

They also mentioned that their vocabulary learning way were actively developed because of frequent reading and group discussions.

(S6) *“Previously, I rarely used dictionaries or other tools to learn new words, which limited my vocabulary. During the training course, I adopted active vocabulary learning strategies, including frequent use of online dictionaries, memorization, and applying new words in context during discussions and presentations. These strategies have improved my vocabulary source and application for my overall communication skills.”*

For (2) using appropriate word, students witnessed some improvements from generic to precise terminology (e.g., from “harmful to something” to “carbon emissions” or “renewable energy”). Therefore, they used more topic-specific and academic vocabulary in presentations and discussions.

(S3) *“Before the training course, I used general language in my presentations, like saying 'harmful to something' instead of specifying what was harmful. After the course, I use more*

precise terminology, transitioning from general to specific expressions, such as “carbon emissions” and “renewable energy.” I now use more precise language in my academic communications, which has made my arguments more persuasive.”

4.2.2.3.2 Sentence structure and grammatical accuracy

Based on student feedback, 80% of participants reported substantial improvements in their sentence structures through HOTS-based tasks. Specifically, these students transitioned from using simple sentences to incorporating compound and complex sentence structures, demonstrating enhanced syntactic variety in their spoken outputs. This shift reflected their ability to analyze linguistic elements, breaking down grammatical patterns and reconstructing them more sophisticated expressions. Additionally, students also noted improvements in grammar, including the accurate use of tenses and advanced grammatical points such as reported speech, passive voice, and relative clauses. This aligned with the evaluating domain, where students critically assessed the appropriateness of their grammatical choices and adjusted their usage to better align with task demands.

The integration of these elements into their speech further illustrated their creating skills, as they synthesized grammatical knowledge to produce coherent and well-structured outputs that effectively conveyed their ideas. From the students’ answers about sentence structure, grammar, and speaking improvements, they knew how to (1) improve sentence structures, (2) use appropriate transitional words, (3) use correct grammatical points, and (4) communicate persuasively. Specifically, as regards (1) improving sentence structures, students’ structures transformed from simple to complex sentences with some popular grammatical points such as compound-complex, conditional, passive voice, indirect speech. The qualitative data demonstrated that students improved their sentence variety to reduce repetitive patterns and enhance clarity for their explanations.

(S8) “Before the course, my sentences were simple with basic structures and frequent grammatical mistakes. Throughout the course, I improved my sentence complexity by learning to construct compound and complex sentences, use conditional forms, and apply passive voice and indirect speech. It helped me reduce repetition and clarify my explanations better. Now, I am able to use a variety of sentence structures in my presentation.”

Respecting (2) using appropriate transitional words, the use of transition words was increased for smooth idea expression (e.g., “furthermore,” “however,” “on the contrary”) as well as more logical and connected ideas within speeches, directly contributing to the persuasiveness and coherence of the arguments.

(S3) *“Before, my ideas were often disconnected, and I struggled to link them smoothly in my presentations. During the course, I learned to use transitional words like ‘furthermore,’ ‘however,’ and ‘on the contrary’ to connect my ideas logically and enhance the flow of my arguments. I now find it easier to connect ideas, which has directly contributed to the logic and persuasiveness of my arguments.”*

Concerning (3) using correct grammatical points, students’ grammatical usage was improved with some elements such as verb tenses, subject-verb agreement, prepositions, passive voice, relative clauses during the treatment process.

(S4) *“I frequently made grammatical errors, such as incorrect verb tenses and subject-verb agreement. During the course, I focused on improving my grammar by correcting these errors, using relative clauses and correct prepositions. My grammar has improved.”*

This improvement enhanced students’ ability (4) to communicate persuasively in presentations by reducing grammatical inconsistencies in their spoken tasks.

(S4) *“After the course, I enhanced my persuasive skills by integrating better grammatical structures and varied sentence forms into my presentations. These improvements have allowed me to express my ideas more compellingly, making my communications more effective and engaging.”*

4.3 Students' perceptions of HOTS-based tasks

The third research explored students' perceptions of HOTS-based tasks. To investigate, qualitative data were gathered from students' reflection through semi-structured interviews. These reflections were analyzed for insights into students' experiences and preferences during the learning process with HOTS-based tasks.

4.3.1 General perceptions of HOTS-based tasks

From semi-structured interviews, students' perceptions of HOTS-based tasks application were reflected through the data illustrated in Table 4.9. The descriptive statistics from the SPSS analysis showed a high level of student satisfaction with HOTS-based tasks, indicating effective engagement and positive outcomes. Specifically, the data illustrated consistent mean scores of 4.30 to 4.70 across individual and group worksheets, with very low standard deviations (0.483). For instance, in both individual and group settings 100% of students rated their satisfaction at 4.00 and 5.00, highlighting a strong acceptance and successful implementation of HOTS tasks.

Table 4.9 Students' satisfaction level for HOTS-based tasks application

	HOTS-based individual task	HOTS-based group task
Mean	4.30	4.70
Std. Deviation	.48305	.48305

4.3.2 Students' perceptions from semi-structured interviews on HOTS-based tasks

Based on the students' responses, after completing the course, students expressed varied opinions on their preferences for HOTS-based individual and group tasks. They appreciated individual tasks for allowing them to work independently, focus on their strengths, and manage their own learning pace. Furthermore, they also favored group tasks, highlighting the benefits of collaborating, sharing ideas, and appreciating diverse perspectives. These reflections illustrated the complementary strengths of HOTS-based tasks with 7 themes, including (1) useful critical thinking skills practice, (2) cognitive skills familiarity, (3) independent work, (4) group work, (5) content quality improvement, (6) language improvement, (7) presentation skills improvement.

Concerning (1) useful critical thinking skills practice, students acknowledged the significant role of HOTS-based tasks in improving students' critical thinking skills. They claimed that designed tasks helped them engage deeper in cognitive process for future academic learning and professional working.

(S3) *"HOTS-based tasks really helped me develop my critical thinking skills, which I need for my future career and learning."*

(S6) *"I found HOTS-based tasks really helpful for me. They helped me to improve my critical thinking skills. The skills I need for working in professional environment and further learning."*

Regarding (2) cognitive skills familiarity, students shared that the combination of step-by-step guiding questions with integrated materials helped them gradually become familiar with the process of analyzing, evaluating, and creating. The designed tasks enabled them to practice critical thinking in manageable stages, which was particularly beneficial for those who were new to such cognitive demands.

(S4) *"These tasks pushed me through the steps of analyzing problems, evaluating different viewpoints, and creating my own solutions, rather than just memorizing facts. That was something I didn't practice before"*

(S12) *"The tasks trained me to think critically and organize my ideas better. Before, I used to accept information without questioning much, but now I try to analyze, evaluate, and even come up with my own solutions."*

For (3) independent work, students highlighted that the HOTS-based individual task encouraged their learning autonomy. Specifically, they experienced opportunities to manage their learning pace and develop their personal responses.

(S3) *"I personally found that HOTS-based individual tasks helped me work more independently. I had the space to develop my own ideas and really focus on my strengths in thinking."*

(S10) *"HOTS-based individual tasks really helped me become more independent in my learning. When I worked on these tasks, I could manage my own learning pace and took more responsibility for how I approached the problem."*

Respecting (4) group work, students reported that designed tasks were effective in enhancing their collaborative work and encouraging diverse viewpoints expression. Students felt more empowered to articulate their different perspectives, even when those differed from peers.

(S2) *"Practicing HOTS-based group tasks helped me become more confident in sharing my personal opinions. Before, I was quite shy and often worried that my ideas were not good enough. But when working in groups with these kinds of*

tasks, I felt encouraged to think deeply, analyze different perspectives, and contribute my own thoughts. That made me realize that my voice matters."

(S6) "HOTS-based group tasks helped me become more confident because I know that each person will have different perspectives. My opinion might be different from others'. It is still a good viewpoint if I can support it with logical reasoning."

About (5) content quality improvement, students marked their improvements in persuasiveness of their oral presentations' content. After the intervention, they developed clearer organization of introduction, bodies, and conclusion.

(S4) "Honestly, I think HOTS-based tasks have made a real difference in how I organize and deliver my public speaking content. The arguments I present are now more persuasive because I've been encouraged to analyze the topic deeply, evaluate different perspectives, and even come up with creative solutions or personal insights. Overall, my speech content has become more convincing and professional."

(S12) "Before, my presentations were basic and sometimes lacked connection among the ideas. But after working with these tasks, I've learned how to structure my ideas better with an attracting introduction, a well-developed body, and a consistent conclusion."

About (6) language improvement, students mentioned that their language use improved in terms of sentence structures, vocabulary selection, and grammar choice. Particularly, they were more aware of constructing compound and complex sentences with more precise vocabulary use. Furthermore, various material exposure also contributed to their better grammatical use.

(S2) "I think HOTS-based tasks really helped improve my language use, especially in how I construct more complex sentences. Before, I mostly used simple and short sentences, but now I try to combine ideas using compound and complex sentence structures."

(S6) "I notice that I can learn more vocabulary from materials and choose vocabulary more carefully. I prefer words that better match the context and show more precise meaning."

(S10) "Based on material exposure, I can improve my grammar by observing they ways ideas are connected with tenses and sentence structures."

Finally, as to (7) presentation skills improvement, students expressed their better English public speaking. The designed tasks increased their confidence in convincing content, pushing their public articulation.

(S4) "Personally, HOTS-based tasks helped me improve my public speaking skills. Because the tasks required me to analyze information, organize my ideas clearly, and present them logically, I became more confident when speaking in front of others."

(S12) "I learned how to respond to materials and support my arguments with evidence, which made my presentations more convincing. Compared to before, I feel that I can now deliver a speech with better structure and more confidence."

The findings from the study revealed improvements in students' critical thinking skills, content quality, and language use. Most students expressed positive perceptions of the HOTS-based tasks application. Regarding research question 1, students demonstrated improvements in analyzing, evaluating, and creating skills. Their analyses were deeper and more logical with stronger idea connections. Their evaluation was improved as they shifted from personal opinions to evidence-based arguments. Their creativity also improved via better future prediction and solution suggestions. Concerning research question 2, students' English Public Speaking showed improvements in terms of content quality (introduction, body, conclusion) and language use. Their introduction was more engaging through attractive hooks and clearer thesis statements. Body paragraphs reflect better organization and persuasiveness via the use of topic sentences, supporting sentences, and evidence. In conclusion, students were better able to summarize the main ideas before offering relevant solutions. For research question 3, students expressed positive perceptions of the HOTS-based tasks with some aspects of critical thinking practice, familiarity with cognitive skills, independent and group work, content quality, and language use. Overall, the application of HOTS-based tasks improved students' critical thinking skills, their content quality and language use in the English Public Speaking context.