

CHAPTER 3

RESEARCH METHODOLOGY

This chapter mainly provided the details of research methodology which were applied for achieving the stated objectives as identified in Chapter 1. The content consisted of the essential information on the research design, the research context, the participants, the instruments, the data collection procedure, and the data analysis.

3.1 Research Design

This study adopted a pre-experimental design, specifically the one-group pretest - posttest format, based on both ethical and contextual considerations. While it is acknowledged that pre-experimental designs may have limitations in terms of internal validity, this approach was deemed most appropriate for the nature and setting of the current research.

Firstly, the intervention could not be integrated into a regular classroom setting, as doing so would have directly influenced students' official academic performance and grades. Random assignment or withholding potentially beneficial instruction from a control group could raise serious ethical concerns, particularly in an educational context where fairness and equal learning opportunities are essential. The use of an experimental or quasi-experimental design would have required manipulating variables within the actual curriculum, which was not ethically permissible.

Secondly, the primary aim of this study was to explore the potential effects of the HOTS-based tasks on students' English Public Speaking performance and critical thinking skills in an educationally meaningful context. The pre-experimental design allowed for practical implementation of the intervention with minimal disruption to students' academic responsibilities while still enabling the researcher to observe measurable changes in targeted skills. Thus, the volunteer group of students were recruited for this study.

3.2 Research variables

Cohen et al. (2010) stated that in an experimental study, one variable-referred to as the independent variable-is deliberately modified to observe its effect on another variable, known as the dependent variable. In the same book, an independent variable is argued as the input variable, whereas the dependent variable is considered as the

outcome variable. Therefore, the independent variable in this study was the HOTS-based tasks and the dependent variables were the students' critical thinking skills, their content quality and language use.

3.3 Research context

This study was conducted at a university in Vietnam, where the English language curriculum was especially designed to develop language proficiency among English – majored students. Notably, the university offered a course title English Public Speaking, which provided a relevant context for the design and application of HOTS-based tasks. According to the school's official curriculum, the Bachelor of Arts program at the Faculty is designed with two phases including a general English phase and English majored phase within 8 semesters. The courses in the first four semesters mainly focus on the students' English practice improvement, such as listening, speaking, reading, writing, pronunciation, and grammar. Subsequently, students are required to register English courses for sharpening their language skills and preparing for their selected majors. Before English Public Speaking Course, English majored students must take English Speaking I (2 credits), English Speaking II (2 credits), and English Speaking III (2 credits) to ensure that they can use English to basically express their viewpoints. Particularly, English Speaking I and English Speaking II courses are designed to target students' English-speaking improvement in terms of idea expressions for daily communication situations. English Speaking III aims to boost students' group discussion and communication skills, whereas English Public Speaking course (3 credits) is added to develop students' critical thinking and oral presentations. As demonstrated in Chapter 1, English Public Speaking (EPS) has been difficult for tertiary students because they usually struggle with both content quality and language use of the speech. Therefore, these two aspects of EPS need to be assisted through the HOTS-based tasks.

3.3.1 Participants

Thirty participants were recruited voluntarily through the following steps. Firstly, a notification was posted on the Facebook page of the Faculty of Foreign Languages to notify third-year English majors about an upcoming event. A complimentary training session was set to be launched, seeking voluntary participation from students to improve their critical thinking skills. Students who wished to take part in this training course should complete courses of English Speaking I, English Speaking II, English Speaking III, and English Public Speaking. Interested students were invited to complete a survey link to provide their personal information, including name, student ID, and contact number. Using this information, the researcher contacted them via Zalo

to share course-related details and confirm their willingness to participate. Based on a first-come, first-served basis, 30 students were selected and confirmed their participation through a follow-up phone call. Prior to the training, the selected students attended an orientation session with the researcher to discuss the course objectives and session content. During this meeting, they signed a voluntary consent form. Participants were also informed that they could withdraw from the study at any time without any consequences for their academic standing.

3.3.2 Research procedure

The study was conducted in four steps, along with the information outlined in the lesson plan in Appendix A. After recruiting the participants, the implementation process followed four main steps: Step 1: In the first week, students reviewed key principles of oral presentation and completed a pre-oral presentation test. Step 2: HOTS-based tasks involving both individual and group work were introduced for Topic 1 (Sessions 1–4) with group presentations. Students also recorded their reflections in a journal during this period. Step 3: Similar to Step 2, students engaged in HOTS-based tasks for Topic 2 (Sessions 5–8), but presentations were completed individually. Reflective journaling continued throughout this phase. Step 4: In the final session, students took a post-oral presentation test and participated in a semi-structured interview. All data collected through these steps were used to address the three research questions, as illustrated in Figure 2.

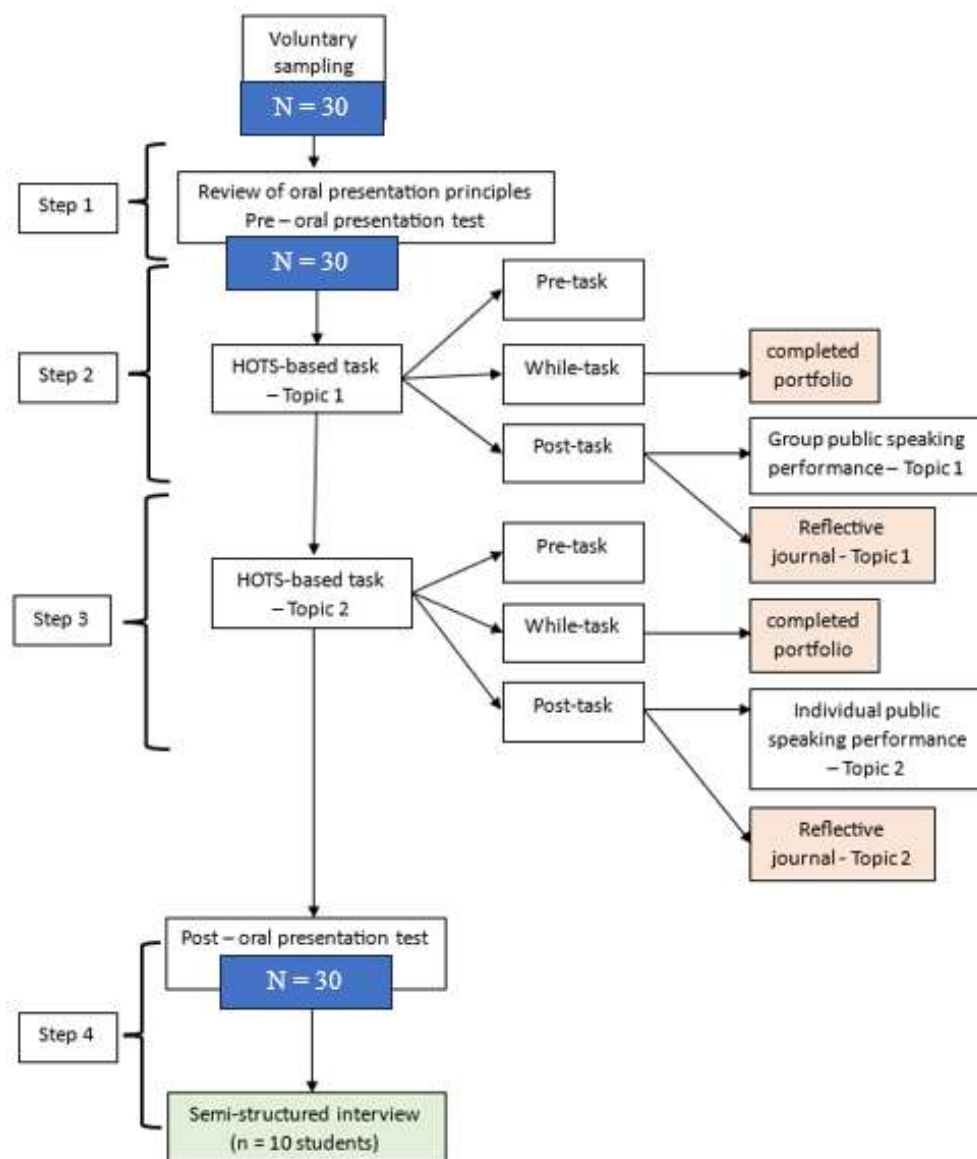


Figure 3.1 Research procedure for the current study

3.4 Research instruments

In this study, a range of instruments including pre- and post- oral presentation tests, HOTS-based tasks, reflective journals, and semi-structured interview were employed. They were constructed and validated for both quantitative and qualitative data collection. The whole instrument design process was described below.

3.4.1 The pre- and post-oral presentation tests and rubric

3.4.1.1 Description of pre- and post-oral presentation tests

Regarding the pre-oral presentation test, in week 1, after reviewing oral presentation principles, students were required to prepare a presentation on the topic "Should education depend on technology?". They were given 10 reading sources with two opposing viewpoints for references. Students had 7 minutes to deliver their presentations with PowerPoint slides as visual aids focusing on their arguments. This presentation was directly performed, recorded, and graded according to the rubric in section 3.4.1.2. in class.

Concerning the post-oral presentation test, students followed the same requirements as the pre-oral presentation test for the same topic in week 6. The 7-minute student presentation was performed and recorded and graded based on the below mentioned rubric.

3.4.1.2 Description of oral presentation rubric

The rubric utilized in this study was adapted from Iberri-Shea (2017), the 4-H Public Speaking Rubrics and the Public Speaking Presentation Score Sheet from The Saskatchewan 4-H Foundation and The West Virginia University Extension Service respectively. It incorporated the scoring method of Khattri et al. (1998) to align with the learning outcomes of students' oral presentations. The adapted rubric was tailored to assess students' oral presentations, focusing on critical thinking skills (analyzing, evaluating, creating), content quality (introduction, body, conclusion, overall presentation), and language use (vocabulary, sentence structures, grammar, and intelligibility) with the scale of 4 (see appendix B).

3.4.1.3 Validation process of the oral presentation rubric

This rubric, subsequently, was validated by two experienced lecturers, who were PhD holders of English Language Studies with over 10 years of teaching experience in universities. They have been recognized for their expertise in language assessment and applied linguistics. Both have made significant academic contributions, including publishing numerous research papers in esteemed journals and presenting them at international conferences. They commented to provide clearer criterion to evaluate students' group and individual oral presentation, better connection with HOTS-based task and the possible way for minimizing the examiners' subjectivity during their scoring processes. The adapted rubric was revised based on the comments.

3.4.2 HOTS-based tasks

3.4.2.1 Components of HOTS-based Tasks

The HOTS-based tasks (Appendix A) utilized in this study were designed to improve tertiary students' English Public Speaking performance and their critical thinking skills. They were the combination of the theories of TBLT supported by Ellis (2003) and HOTS including analyzing, evaluating, and creating based on Anderson and Krathwohl (2001) and learning objectives as presented in Table 3.1.

Table 3.1 The series of HOTS-based tasks

Task circle	Worksheet	Applied theory	Specific objectives
Pre-task		Ellis (2003)	- Activate students' background knowledge on the topic generally.
While-task	Worksheet # 1	Ellis (2003)	- Show the general picture of the identified topics to students with some vocabulary exercises.
	Worksheet # 2	Ellis (2003)	- Encourage students to express their personal thinking on the topics. - Create opportunities for students to listen to different viewpoints from their friends.
	Worksheet # 3	Ellis (2003)	- Ask students to read more and find the writer's comprehension through his/her argument embedded in topic sentence, supporting information, and evidence.
	Worksheet # 4 – HOTS-based individual task	Anderson & Krathwohl (2001), Ellis (2003)	- Practice analyzing, evaluating, and creating skills individually by answering the guided questions.
	Worksheet # 5 - HOTS-based group task	Anderson & Krathwohl (2001), Ellis (2003)	- Practice analyzing, evaluating, and creating collaboratively by debating against their friends' viewpoints based on the guided questions.
	Worksheet # 6	Ellis (2003)	- Create opportunities for students to modify their detailed outlines and scripts for collaborative and individual oral presentation.
	Worksheet # 7	Ellis (2003)	
Post-task	Reflective journals	Ellis (2003)	- Support students to reflect on their own learning.

Specifically, worksheet #4 HOTS-based individual worksheet, was designed based on the theory argued by Anderson and Krathwohl (2001) for HOTS. The subskills, the indicators, and the HOTS-integrated questions were planned for scaffolding students how to think critically via small steps of distinguishing, finding coherence, detecting, judging, making hypotheses, and designing as described in Table 3.2. As argued in this study, when students completed this worksheet individually, they understood their reading materials and built some critical thinking on the chosen topic via activities of analyzing, evaluating, and creating process.

Table 3.2 The summary for the content of the worksheet # 4 HOTS-based individual tasks

Higher-Order Thinking Skills	Subskills	Indicators	Topic 1 Tertiary education	Topic 2 Nuclear power
Analyzing	Differentiating	Distinguishing	1.1	1.1
	Organizing	Finding coherence	1.2	1.2
			1.3	
Evaluating	Checking	Detecting	2.1	2.1
	Critiquing	Judging	2.2	2.2
			2.3	2.3
Creating	Generating	Making hypotheses	3.1	3.1
	Designing	Designing	3.2	3.2

Particularly, worksheet # 5 HOTS-based group task, was designed based on the theory argued by Anderson and Krathwohl (2001) for HOTS. Again, the subskills, the indicators, and the HOTS-integrated questions were taken advantage for scaffolding students' critical thinking through the group discussion. For this kind of group task, students' roles were assigned to share their different viewpoints towards the topics, and then to critique their friends' ideas via the guided HOTS-based discussion questions as summarized in Table 3.3.

Table 3.3 The summary for the content of the worksheet # 5 HOTS-based group tasks

			Topic 1 Tertiary education	Topic 2 Nuclear power
Analyzing	Differentiating	Distinguishing	1.1	1.1
	Organizing	Finding coherence	1.2	1.2
Evaluating	Checking	Detecting	2.1	2.1
	Critiquing	Judging	2.2	2.2
			2.3	2.3
Creating	Generating	Making hypothesis	3.1	3.1
	Designing	Designing	3.2	3.2

Furthermore, students were required to do HOTS-based tasks individually and collaboratively under the theory of Zone of Proximal Development (ZPD) claimed by Chaiklin (2003) to understand how to critique materials and other people's different viewpoints.

3.4.2.2 Validation process of HOTS-based Tasks

HOTS-based tasks were validated by two experienced lecturers with PhDs in English Language Studies (ELS), each having over 15 years of teaching experience with undergraduate and graduate students. They have had extensive

backgrounds in curriculum development, language assessment, intercultural communication, and have published numerous research papers in reputable academic journals. Both have also been involved in mentoring graduate students, conducting workshops, and delivering professional development courses for educators in the field of English language teaching. They gave valuable comments to improve the interrelation between the course's outcomes and the HOTS-based tasks application. After considering the experts' comments and discussing with the supervisor, the specific course's learning outcomes, the organization of pre- while- and post-task, the questions of analyzing part, the format of the worksheets, and the time allocation were revised (see Appendix A).

3.4.3 Portfolio

A portfolio in this study was a collection of all the while-tasks that students completed during the training process. Specifically, as outlined in the lesson plan, this included worksheet 1.4, worksheet 1.5 for HOT-based task application, discussion recordings, worksheet 1.7, and group transcripts of topic 1 throughout sessions 1 to 4.

Similarly, from session 5 to session 8, another collection was assembled, including worksheet 2.4, worksheet 2.5 for HOTS-based task implementation, discussion recordings, worksheet 2.7, and individual transcripts of topic 2. In summary, students completed two portfolio packages, two times for oral presentation practice of topics 1 and 2 during the whole training process and two times for reflective journal completion in the post-task procedure.

3.4.4 Reflective journal

3.4.4.1 Description of reflective journal

In this study, the reflective journal (see appendix C) served as a tool for capturing students' critical thinking skills of analyzing, evaluating, creating, and the improvement of content quality and language use after the training on topic 1 and 2 with HOT-based tasks. It consisted of four essential sections - analyzing (3 open-ended questions), evaluating (3 open-ended questions), creating (2 open-ended questions), quality content and language use (2 open-ended questions) - as shown in Table 3.4. After answering related questions of each section in English, students were required to self-evaluate their personal improvement scores in terms of analyzing, evaluating, creating, quality content, and language use improvement based the scale of 10 for before and after being engaged in the application of HOTS-based tasks. Particularly, participants in this study self-assessed their progress across three key areas including critical thinking skills, content quality, and language use via reflective journals. Such self-assessment activities were conducted twice during the main study. In the first

phase, students self-assessed themselves on these three aspects both before and after completing HOTS-based tasks related to Topic 1. In the second phase, they performed a similar self-assessment after completing HOTS-based tasks for Topic 2. This recurring self-assessment allowed students monitor their own improvement throughout the intervention.

Table 3.4 Construction of reflective journal

Section	Content	Number of questions
1	Analyzing	3
2	Evaluating	3
3	Creating	2
4	Quality content and language use	2

3.4.4.2 Validation process of reflective journal

To ensure the validity of the reflective journal content, feedback was actively sought from two highly qualified lecturers with PhDs in English Language Studies and extensive experience in university education. Their expertise in language assessment and applied linguistics has been acknowledged, and they have notably contributed to academia through the publication of numerous research articles in journals and presentations at international conferences. Their thorough review of the questions helped minimize ambiguity, simplify complex structures, control subjectivity, and revise the format and scale for student self-evaluation. The revised reflective journal, along with the original version, was included in Appendix C.

3.4.5 Semi-structured interview

3.4.5.1 Description of semi-structured interview

Based on Cohen et al. (2010), among the different types of interviews, this study used a semi-structured interview to gather quantitative and in-depth qualitative data on students' perceptions of HOTS-based tasks. The interview was structured into three main sections: HOTS-based task completion, participants' perceptions of HOTS-based tasks, and participants' self-evaluation. The first section aimed to explore participants' perceptions of HOTS-based task completion through two open-ended questions. Two other questions of 5-Likert scale were also added into this section to address their satisfaction level. The second section covered participants' perceptions of HOTS-based task applications with a total of nine questions, which focused on participants' analyzing, evaluating, creating, content quality, language use, general application of HOTS-based tasks, and their perceptions of the intervention. The final section addressed participants' self-evaluation through

one question. Additional details could be found in Table 3.5, and the complete list of questions was provided in Appendix D.

Table 3.5 The construction of semi-structured interview

Sections	Content	Number of questions
1	HOTS-based tasks completion	2
2	Participants' perceptions of HOTS-based tasks application	
	Analyzing	1
	Evaluating	1
	Creating	1
	Content quality	1
	Language use	2
	Participants' general application of HOTS-based tasks	1
	Participants' personal perceptions of the application of HOTS-based tasks	2
3	Participants' affection	1

3.4.5.2 Validation process of semi-structured interview

To validate the content of the semi-structured interview, two highly qualified lecturers with PhDs in English Language Studies. They also have more than ten years of teaching experience in higher education. Their expertise was in language assessment and applied linguistics and have made substantial academic contributions through the publication of numerous research papers in reputable journals and presentations at international conferences. Their feedback addressed ambiguous terms, overly complicated structures, and advocated for the inclusion of a scale to capture more precise responses. The experts' comments were thoroughly scrutinized to guide the necessary revisions. Subsequently, the Vietnamese translated version was adjusted prior to its piloting with students (see appendix D).

3.5. Data collection procedure

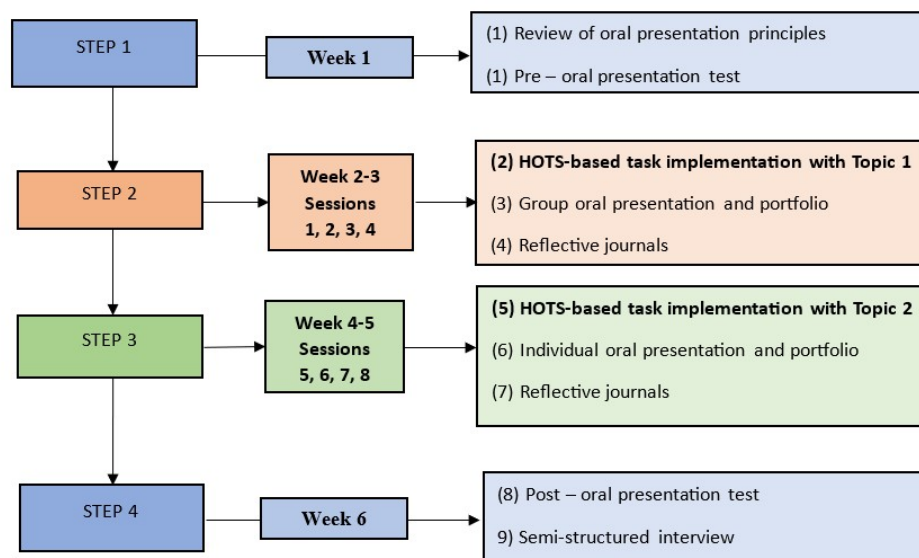


Figure 3.2 The flowchart of data collection procedure

In the main study, a six-week data collection process was conducted to address the research questions outlined in Chapter 1, as displayed in Figure 3. The timeline of activities was as follows.

After the voluntary agreement on participating in this study, the participants underwent a review of oral presentation principles and their pre-oral presentation test in class during the first week. Their 7-minute performances at this time were recorded and scored based on the rubric presented earlier. Their transcripts were submitted directly for later qualitative analysis.

During the second and third weeks, HOTS-based tasks were implemented for topic one: Is a university degree necessary to get a good job?, spanning sessions 1 to 4. Throughout sessions 1 to 3, students worked on HOTS-based tasks by completing the while-tasks including worksheet 1.4 (HOTS-based individual task), worksheet 1.5 (HOTS-based group task) for HOTS-based task application, worksheet 1.7, and group transcripts for topic one. In session 4, students delivered a group presentation and completed reflective journals in English. At this time, all students' group presentations were recorded, and their reflective journals were collected via Microsoft Teams, which was an interactive platform used for connection between the researcher and students at the university.

During weeks four to five, HOTS-based tasks were implemented for topic two: Is nuclear energy the solution to global warming problems in Vietnam?, spanning from session 5 to session 8. From session 5 to session 7, students participated in HOTS-based tasks by completing worksheet 2.4 (HOTS-based individual task), worksheet 2.5 (HOTS-based group task) for HOTS-based task implementation, worksheet 2.7, and individual transcripts for topic 2. As their portfolio, in session 8, students presented individually in class. The students' presentations were recorded live in class, and transcripts were collected. Afterward, students completed their reflective journals in English. All completed reflective journals were collected via the Microsoft Teams.

In the sixth week, every participant undertook their post-oral presentation test with video recordings and transcript submission that were similar to the pre-oral presentation test in the first week. After that in the same week, 10 participants were randomly selected for semi-structured interviews about their perceptions of HOTS-based task applications. The interviews were conducted individually in Vietnamese within around 45 minutes for each student. Subsequently, the interview recordings were transcribed.

For preparing the interview, a survey link was sent out to purposive students to gather their available times. Once the students' availability was determined, the researcher and the student mutually agreed on a specific and convenient time to conduct the individual interview via Microsoft Teams. Prior to commencing the interview, the researcher explained its purpose, the expected duration, and asked for permission to record the interview. If the student consents, the interview was proceeded, otherwise, it was canceled.

3.6 Data analysis

3.6.1 Quantitative data

To validate the pre- and post-oral presentation scores, a collaborative evaluation process was employed. The students' performances were assessed based on their critical thinking skills - specifically analyzing, evaluating, and creating-as well as content quality and language use. These assessments were conducted by the researcher and a co-evaluator, a PhD colleague with extensive experience in English Public Speaking instruction for tertiary students and adults. The co-evaluator also possesses a strong academic background in TESOL and in the integration of educational technology in language teaching, with a particular focus on fostering critical thinking at the higher education level.

Before beginning the assessment, the co-evaluator attended a training session to ensure a shared understanding of the evaluation rubric and to align assessment criteria with the study's emphasis on enhancing critical thinking through HOTS-based tasks in the context of English public speaking. Each student's oral presentation was scored using detailed rubric, followed by in-depth discussions between the two assessors to reach a consensus on each score.

The agreed-upon scores were then entered into SPSS for statistical analysis to compare mean scores via Paired t-test, to calculate effect size and degrees of freedom. Mean comparisons were used to evaluate students' performance before and after the intervention, with particular attention to improvements in the three targeted critical thinking dimensions, content quality, and language use.

3.6.2 Qualitative data

Regarding students' qualitative data collected from reflective journals, to explore students' in-depth perceptions of their learning progression from qualitative data. Firstly, the reflective journals were examined to identify self-assessed score discrepancies across the three critical thinking components: analyzing, evaluating, and creating. The researcher initially reviewed and recorded the self-assessment data, then a PhD colleague as mentioned above was invited to verify the accuracy of the recorded data. Prior to the examination, the inter-rater was trained in the study's theoretical framework to ensure alignment and consistency during the verification process. Once the numerical data were confirmed, the researcher illustrated them into a line graph. Secondly, for tracing students' learning process across critical thinking dimensions, including analyzing, evaluating, and creating via completed learning portfolios. The qualitative data was retrieved and coded with an inter-coder, the same PhD colleague. Together, researcher and inter-rater thoroughly reviewed the transcripts and established clear coding criteria for each sub-skill of the critical thinking domain, following the indicators stated by Anderson & Krathwohl's (2001) and the revised Bloom taxonomy by Anderson (2001). Each sentence was examined to determine whether it reflected one of the three critical thinking components. Throughout the process, the discrepancy rate between our judgments remained under 20%.

For qualitative data collected from semi-structured interviews, after transcribing the interview content, responses were organized according to the predetermined interview questions. The data were then categorized into thematic codes that aligned with the research objectives related to critical thinking. The same PhD lecturer was invited to cross-check the transcripts and the thematic classifications.

Her feedback was useful for identifying accurate and reflective characteristics themes and detecting any misinterpretations or thematic inconsistencies.

3.6.3 Data analysis

To address research question 1, which discovered the effects of HOTS-based tasks on students' critical thinking skills, a combination of quantitative and qualitative analyses was conducted. As described in Table 3.6, quantitative data was primarily collected from students' scores on pre- and post- oral presentation tests. The scores were analyzed by using Paired Samples t-Test, along with the effect size and degrees of freedom to determine the significance and strength of changes in students' improvements across critical thinking skills including analyzing, evaluating, and creating. Moreover, transcripts of students' presentations were analyzed through content analysis to illustrate the improvements across the cognitive domains. Additionally, descriptive analysis of self-evaluation scores was employed to examine students' personal awareness of their progress in these subskills, providing further insights into the improvements of critical thinking skills. Besides, quantitative and qualitative data from reflective journals were collected to thematic analysis to explore students' cognitive engagement and development in the same critical thinking dimensions.

To explore research question 2, multiple data sources and analytical approaches were conducted to investigate students' English Public Speaking performances regarding content quality and language use. Firstly, as presented in Table 3.6, scores from pre- and post-oral presentation tests were analyzed via Paired Samples t-Test, with effect size and degrees of freedom to demonstrate the significance of changes in students' performances. The analysis mainly focuses on key dimensions of content quality (including introduction, body, conclusion and overall presentation), and language use (comprising word choice, sentence structures, grammar, and intelligibility). Secondly, transcripts of students' presentations were analyzed through content analysis to identify the improvements across the presentation sections. In addition, descriptive statistics from students' self-evaluation scores were applied to compare the improvements across points of time. Finally, students' reflective journals were viewed by descriptive analysis to capture their progress in both content quality and language use.

For the research question 3, as summarized in Table 3.6, students' perceptions of HOTS-based tasks were examined by both quantitative and qualitative data derived from semi-structured interviews. Quantitative satisfaction levels expressed by students regarding the intervention of HOTS-based tasks were analyzed

through descriptive statistics. For deeper insights, interview transcripts were collected to thematic analysis to uncover emerging themes in students' reflections.

Table 3.6 The summary of data analysis

Research question	Instruments	Type of data	Analysis
1. What are the effects of HOTS-based tasks on students' critical thinking skills?	Pre- and post-oral presentation tests	Scores of the students' oral presentations in terms of critical thinking skills	Paired Samples t-Test, effect size and degrees of freedom to compare students' scores of CTs: analyzing, evaluating, and creating between pre- and post-oral presentation tests
		Pieces of writing	Content analysis for CTs: analyzing, evaluating, and creating
	Reflective journals	Self-evaluation scores from students' personal improvement awareness	Descriptive analysis to compare the improvement of CTs including analyzing, evaluating, creating
2. What are the effects of HOTS-based tasks on students' English Public Speaking performances in terms of content quality and language use?	Pre- and post-oral presentation tests	Scores of the students' oral presentations in terms of content quality and language use	Paired Samples t-Test, effect size and degrees of freedom to compare students' scores of content quality (introduction, bodies, conclusion, overall presentation) and language use (word choice, sentence structures, grammar, and intelligibility) between pre- and post-oral presentation tests
		Transcripts of students' pre- and post-oral presentation tests	Content analysis to compare students' content for introduction, bodies, conclusion, overall presentation Descriptive statistics with percentage to compare students' word choice, sentence structures, grammar, and intelligibility
	Reflective journals	Pieces of writing	Content analysis for content quality and language use
		Self-evaluation scores from students' personal improvement awareness	Descriptive analysis to compare the improvement of content quality (introduction, bodies, conclusion, overall presentation) and language use (word choice, sentence structures, grammar, and intelligibility)
3. What are the students' perceptions of the HOTS-based tasks?	Semi-structured interview	Satisfaction level of students for HOTS-based task application	Descriptive statistics
		Transcripts of the interview	Thematic analysis to understand students' perceptions of HOTS-based task application