

**THE UNIVERSITY OF DANANG  
UNIVERSITY OF SCIENCE AND EDUCATION**

---

**NGUYEN THI THANH PHUONG**

**TEACHING WITHIN A SOCIO-CULTURAL CONTEXT USING THE  
STS MODEL: A CASE STUDY IN TEACHING THE TOPIC  
“SOUND” – GRADE 7 NATURAL SCIENCE**

**Major:** Theory and Methodology of Physics Teaching  
**Code:** 9140111

**ABSTRACT OF DOCTORAL DISSERTATION  
EDUCATION SCIENCE**

**Da Nang - 2026**

**The work was completed at**  
**UNIVERSITY OF SCIENCE AND EDUCATION**

Academic Advisors/Supervisors:

1. Prof. Dr. Do Huong Tra
2. Dr. Phung Viet Hai

Reviewer 1: .....

Reviewer 2: .....

The dissertation/thesis will be defended before the University-Level Evaluation Panel (Education Science) at the University of Science and Education on the day ..... month ..... year .....

The dissertation/thesis can be consulted at:

The National Library;

The Library of the University of Science and Education - The University of Da Nang

## INTRODUCTION

### 1. Rationale

Context-Based Teaching and Learning (CBTL) has been confirmed as an effective teaching style that connects scientific knowledge with students' real-life experiences, thereby increasing learning interest and knowledge application competence [32], [54], [57], [110]. Nevertheless, in most studies, cultural (C) and social (S) factors within the local context are often only used for illustrative purposes and are not truly regarded as the center of the teaching organization process, while these are crucial factors in shaping SS's social responsibility and commitment to action [81]. This raises an urgent need to develop teaching models that deeply integrate C and S factors, specifically oriented toward developing targeted qualities.

Among theoretical approaches, the STS (Science – Technology – Society) model has been confirmed as a suitable theoretical framework for integrating scientific knowledge (SK) with real-world issues, including C and S problems [28], [30]. This model places SS at the center, accessing knowledge through solving real-world problems, thereby fostering values and qualities such as responsibility, creativity, and collaboration [31], [55], [100]. However, there is currently no specific study in Vietnam detailing the application of the STS model in teaching NS subjects to develop SS's responsibility towards local C and S issues.

The Sound topic in the Grade 7 NS curriculum is a content area with high integration across physics, biology, and environment. Furthermore, this topic has significant potential for linking with C and S contexts, especially folk music, intangible cultural heritage such as gongs, đàn T'rung, bamboo flutes, etc., of the ethnic groups in the Central Highlands [110], as well as current issues regarding noise pollution in local areas. However, existing studies on teaching this

topic have only focused on competence development [14], [20], and have not effectively integrated the aspect of educating community responsibility and preserving cultural values.

The Central Highlands, with its unique demographic, C, and historical characteristics, is facing the risk of erosion of indigenous cultural identity due to urbanization, migration, and the impact of modern lifestyles [4] [13]. This places an urgent demand on education to preserve culture and nurture a sense of responsibility among the younger generation toward their ethnic communities. On the other hand, economic development and infrastructure growth in the Central Highlands also bring about pressing social issues such as noise pollution, environmental pollution, etc. Therefore, the C and S context in the Central Highlands is highly suitable for integration into teaching the Sound topic, Grade 7 NS subject. This aims to help SS recognize their responsibility regarding local real-world issues, contributing to the goal of Global Citizenship Education linked with the preservation of local cultural heritage, precisely in the spirit of education for sustainable development proposed by UNESCO [112].

Based on the above analysis, the dissertation "Context-Based Teaching and Learning integrated with Culture and Society following the STS Model: A Case Study in Teaching the Sound Topic – Natural Science Subject Grade 7" is implemented with the objective of cultivating SS's responsibility towards C and S issues, contributing to the development of conscious citizens who act for the community.

## **2. Research Objectives**

### ***General Objective***

To design a Context-Based Teaching and Learning (CBTL) process integrated with Culture and Society (C&S) following the STS model in order to cultivate students' responsibility toward C&S issues.

### ***Specific Objectives***

- To systematize and propose the theoretical and practical basis for C&S-integrated CBTL based on the STS model aimed at fostering students' responsibility towards C&S issues; To design and organize teaching the Sound topic (Natural Science Grade 7) according to the proposed C&S-integrated CBTL process; To evaluate the effectiveness of the designed teaching process, specifically: (1) Determine the change in students' responsibility toward C&S issues following the designed teaching process; (2) Assess the influence of C&S-integrated CBTL based on the STS model on students' academic performance in Natural Science.

## **3. Scope and Subject of the Study**

### ***3.1. Subject of the Study***

- C&S-integrated CBTL following the STS model aimed at cultivating students' responsibility toward C&S issues; - The teaching process for the Sound topic (Natural Science Grade 7) integrated with C&S context following the STS model.

### ***3.2. Scope of the Study***

- Content: The content of the Sound topic in the Natural Science Grade 7 curriculum; - Location: The study is conducted at some lower secondary schools (LSS) in the Đák Lák province; - Timeframe: The study is conducted from January 2022 to June 2025; - Experimental Subjects: Grade 7 students participating in the learning process of the Sound topic integrated with C&S context following the STS model.

## **4. Scientific Hypothesis**

If a framework of students' responsibility towards C&S issues can be constructed, and subsequently a process for designing and

organizing C&S-integrated context-based teaching and learning following the STS model can be proposed, then students' responsibility towards C&S issues will be developed without reducing students' academic achievement.

## **5. Research Tasks**

- To overview and propose the theoretical basis for C&S-integrated CBTL following the STS model aimed at fostering students' responsibility toward C&S issues; - To construct the structure of students' responsibility toward C&S issues and the corresponding measurement tools; - To design the C&S-integrated CBTL process following the STS model aimed at fostering students' responsibility toward C&S issues; - To survey the current status of teaching and learning C&S issues in Natural Science Grade 7, especially the "Sound" topic; - To apply the C&S-integrated CBTL process following the STS model to cultivate students' responsibility toward C&S issues in teaching the Sound topic – Natural Science Grade 7; - To conduct a Pedagogical Experiment (PE) on the designed teaching process to verify the scientific hypothesis of the study.

## **6. Research Methodology**

### ***6.1. Theoretical Method***

This method is used to establish the theoretical and practical basis for the dissertation. Specifically, we conducted a systematic overview of domestic and international studies related to: CBTL; CBTL programs based on the STS model; theories and models/scales of students' responsibility; and methods and tools for evaluating and measuring students' responsibility toward C&S issues. Based on the analysis, comparison, and systematization of documents and practical

survey results, the study constructed the theoretical framework for the dissertation.

### ***6.2. Practical Survey Method***

Surveys were conducted on students (SS) and teachers (Ts) at some LSS in the Central Highlands provinces to understand Ts' perceptions and current practices in using C&S contexts in teaching Natural Science, and the level of development of students' responsibility toward C&S issues in the Central Highlands.

### ***6.3. Expert Method***

The expert method was used for the purpose of standardizing: The survey questionnaires for Ts and SS; the structure of students' responsibility toward C&S issues; and the interview protocols.

### ***6.4. Pedagogical Experiment Method***

A Pedagogical Experiment (PE) was conducted with Grade 7 students in Cu Kuin district, Đắk Lắk province to verify the scientific hypothesis of the study.

### ***6.5. Mathematical Statistics Method***

The software Excel, SPSS (version 26), and AMOS (version 24) were used to process the survey and PE results. The Epistemic Network Analysis (ENA) method was used to quantify discourse data (obtained from interviews and questionnaires).

## **7. Scientific and Practical Significance**

- Systematize and develop the theoretical foundation of C&S-integrated CBTL following the STS model, contributing to clarifying the role of this teaching style in fostering students' responsibility toward C&S issues.

- Propose the structure of students' responsibility toward C&S issues, along with specific manifestations and criteria for assessing the change in this responsibility.

- Propose the process for designing and organizing the teaching of the Sound topic (Natural Science 7) integrated with C&S context following the STS model.

- Provide empirical evidence of the effectiveness of C&S-integrated CBTL following the STS model in cultivating students' responsibility toward C&S issues, thereby affirming the feasibility and application value of the proposed teaching process.

- Effectively apply case study research combined with qualitative and quantitative assessment tools in educational research, creating a premise for similar studies in other topics, subjects, or localities.

## **8. Structure of the Dissertation**

The dissertation comprises 153 pages, including 33 Tables and 44 Figures. Apart from the Introduction and the References, the content of the dissertation is divided into 4 chapters.

### **CHAPTER 1: OVERVIEW OF RESEARCH ISSUES**

#### **1.1. Studies on Context-Based Teaching and Learning Integrated with Culture and Society**

##### ***1.1.1. Concept of Context-Based Teaching and Learning Integrated with Culture and Society***

###### ***a. Concept, Origin, and Attributes of Context***

###### ***b. Concept of Cultural and Social Context in Education***

Cultural and Social Context (C&S Context) refers to real-world events, situations, or problems originating from the cultural and social

life of the local area where students live and study. These contexts contain scientific knowledge content and have the potential to be transformed into teaching situations to help students construct necessary knowledge, skills, and attitudes.

### ***c. Concept of C&S-Integrated Context-Based Teaching and Learning***

C&S-Integrated Context-Based Teaching and Learning (C&S-Integrated CBTL) is the use of a fact, event, problem, or situation originating from the cultural and social reality of the local area (where students live and study), which implicitly contains scientific knowledge content, can be developed into teaching situations, and subsequently implemented through learning activities to help students achieve the set objectives.

#### ***1.1.2. Effects of Context-Based Teaching and Learning***

CBTL not only supports the development of thinking skills such as Problem-Solving (PS), critical thinking, and decision-making but also plays a crucial role in enhancing students' motivation, self-esteem, and especially their social awareness and responsibility.

### ***1.2. Studies on Students' Responsibility towards Cultural and Social Issues***

#### ***a. Perspectives on Students' Responsibility towards Cultural and Social Issues***

Within the scope of the dissertation research, discussing "students' responsibility towards Cultural and Social issues" refers to the "quality of responsibility" analyzed previously. This implies that students' responsibility towards C&S issues must be approached as a process of cognition, commitment, and positive action aimed at

solving the specific C&S problems faced by their community. Specifically, the concept is defined as follows:

Students' responsibility towards Cultural and Social issues is the process of cognition, commitment, and implementation of positive actions to contribute to solving the C&S problems that their local area is currently facing.

***b. Students' Responsibility towards Cultural and Social Issues in the 2018 General Education Program***

***d. Models and Structural Scales for Students' Responsibility toward Cultural and Social Issues***

**Table 1.3. Comparison between the Study by Conrad and Hedein (1985) and the Dissertation**

Content	Study by Conrad and Hedein (1985)	Dissertation Study
Research Objective	Measuring students' responsibility toward Social Issues (SI).	Measuring students' responsibility toward Cultural and Social (C&S) Issues.
Research Subject	Students aged 13-14, living and studying in the United States.	Students aged 13-14, living and studying in Vietnam.
Content and Assessment Context	Students participated in community service activities, such as volunteering, solving social problems, and	Students solved learning situations integrated with specific C&S contexts, including learning activities linked to Natural

	joining community groups.	Science (NS) knowledge to solve local C&S issues.
Impact of Teaching Method (TM)	Community service experience.	Teaching and Learning integrated with C&S context (C&S-Integrated CBTL).

### **1.3. Studies on Context-Based Teaching and Learning Following the STS Model**

From the arguments above, it can be affirmed that the STS (Science – Technology – Society) model is a suitable theoretical framework for implementing C&S-integrated Context-Based Teaching and Learning (CBTL) with the goal of cultivating students' responsibility.

### **1.4. Studies on Teaching the Sound Topic**

#### **CONCLUSION OF CHAPTER 1**

Based on the research gaps identified, this dissertation will focus on the following two main research questions: Research Question 1: How can a C&S-integrated CBTL process based on the STS model be designed to cultivate students' responsibility toward C&S issues? How can this be evaluated; Research Question 2: How does C&S-integrated CBTL based on the STS model impact students' academic achievement?

## **CHAPTER 2: THEORETICAL AND PRACTICAL FOUNDATIONS OF CONTEXT-BASED TEACHING AND LEARNING INTEGRATED WITH CULTURE AND SOCIETY FOLLOWING THE STS MODEL**

## **2.1. Context-Based Teaching and Learning Integrated with Culture and Society (C&S)**

### ***2.1.1. Concept***

### ***2.1.2. Functions of C&S-Integrated Context-Based Teaching and Learning***

### ***2.1.3. Principles for Selecting Cultural and Social Contexts in Teaching and Learning***

Principle 1: Allowing students (SS) to participate in the decision-making of the learning context; Principle 2: Considering the diversity/differences among students; Principle 3: The context must be familiar and appropriate for students.

## **2.2. Students' Responsibility toward Cultural and Social Issues**

### ***2.2.1. Concept of Students' Responsibility toward Cultural and Social Issues***

As analyzed in the overview section, in this dissertation, we define the concept of students' responsibility toward C&S issues as follows: "Students' responsibility toward C&S issues is the process of cognition, commitment, and implementation of positive actions to contribute to solving the C&S problems that their local area is currently facing." In this process, students need to clearly identify and understand the issues, demonstrate an attitude of concern, worry, and obligation to participate in implementing measures to solve the problems. At the same time, students must equip themselves with the necessary skills and knowledge to solve the problems effectively. Finally, students must believe that their actions can create positive changes for the issues. This requires them to believe in their own

ability and the power of specific actions to promote positive change regarding those C&S issues.

### ***2.2.2. Structure of Students' Responsibility toward Cultural and Social Issues***

#### ***A. Step 1: Proposing the Theoretical Framework Structure***

***Table 2.2. Components of the Structure of Students' Responsibility toward C&S Issues.***

Component	Evaluation Purpose
Attitude toward C&S Issues	Evaluating the extent to which students feel concerned about local C&S issues.
Implementation of Measures to Solve C&S Issues	Evaluating the extent of completing behaviors aimed at solving local C&S issues.
Attitude toward the Implementation of Measures to Solve C&S Issues	Evaluating the extent to which the individual feels obliged to implement measures to solve local C&S issues.
Belief in One's Own Capacity to Solve C&S Issues	Evaluating the extent to which students are willing or able to believe that their own implementation of measures will have a positive impact on solving local C&S issues.

#### ***B. Step 2: Analyzing Expert Opinions***

#### ***C. Step 3: Adjusting the Theoretical Framework Structure of Students' Responsibility toward C&S Issues after Consulting Experts***

Based on the experts' feedback, we revised and explained Appendix 4 and finalized the theoretical framework structure of

students' responsibility toward C&S issues as shown in Figure 2.1. Descriptions of the quality criteria for each behavioral indicator are presented in Table 2.4.

***D. Step 4: Standardization of the Responsibility Theoretical Framework Structure:***

(1) Reliability coefficient of the constructed responsibility theoretical framework; (2) Exploratory Factor Analysis (EFA); (3) Confirmatory Factor Analysis (CFA).

***2.2.3. Proposing Tools for Measuring Students' Responsibility toward Cultural and Social Issues***

In this study, the dissertation will use the behavior observation method, interview method, and questionnaire method to assess students' responsibility toward C&S issues. Specifically, the questionnaire is designed based on questions constructed using the Likert method, semantic differential method, ranking method, and open-ended questions.

***2.3. C&S-Integrated Context-Based Teaching and Learning Following the STS Model to Cultivate Students' Responsibility toward Cultural and Social Issues***

***2.3.1. The STS Model***

***2.3.2. Function of the STS Model in Cultivating Students' Responsibility toward Cultural and Social Issues***

***2.4. Practical Basis***

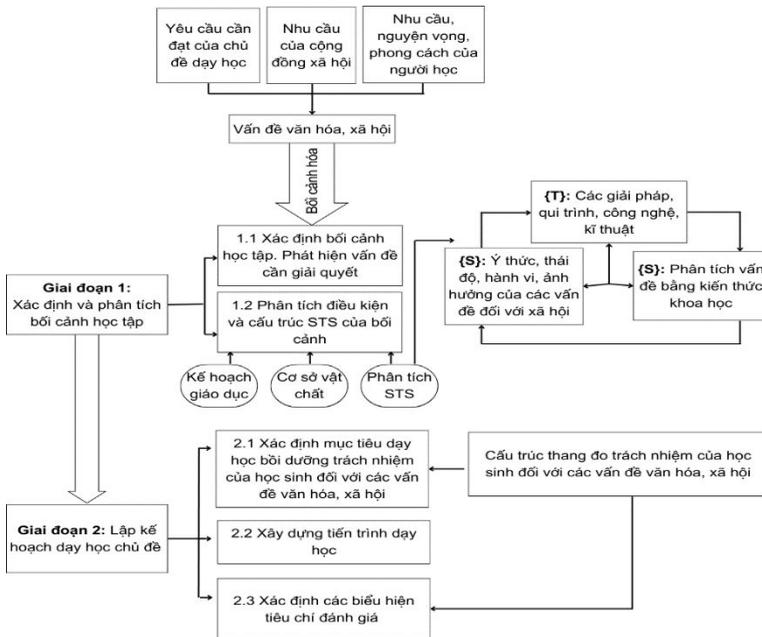
***2.4.1. Purpose, Subjects, and Scope of the Survey***

***2.4.2. Survey Results***

***2.4.3. Discussion of Results***

The survey results emphasize the need to propose a C&S-integrated teaching and learning process along with a scientific assessment system to cultivate students' responsibility toward C&S issues.

## 2.5. Process for Designing Subject Teaching Integrated with Cultural and Social Context Following the STS Model to Cultivate Students' Responsibility toward Cultural and Social Issues.



*Figure 2.6. Process for designing Subject Teaching integrated with C&S Context following the STS model to cultivate students' responsibility.*

### 2.5.1. Phase 1: Selecting the Teaching Topic

### 2.5.2. Phase 2: Planning the Teaching

## **CONCLUSION OF CHAPTER 2**

Chapter 2 has established the theoretical and practical foundation for implementing C&S-integrated Context-Based Teaching and Learning (CBTL) following the STS model to cultivate students' responsibility toward local C&S issues

## **CHAPTER 3: DESIGNING THE TEACHING PROGRESSION INTEGRATED WITH CULTURAL AND SOCIAL CONTEXT FOLLOWING THE STS MODEL IN TEACHING THE SOUND TOPIC – NATURAL SCIENCE GRADE 7**

### **3.1. Content Structure of the Sound Topic in the Natural Science Grade 7 Curriculum**

### **3.2. Basis for Selecting Cultural and Social Contexts for Teaching the Sound Topic**

Based on the three principles for selecting C&S contexts in teaching to cultivate students' responsibility, we selected two typical C&S contexts in the Central Highlands to serve as learning contexts for the Sound topic: Context 1: Preserving the culture of intangible cultural heritage (ICH) musical instruments of the Indigenous Peoples of the Central Highlands; Context 2: Reducing the influence of sound from swiftlet farming houses on surrounding households.

### **3.3. Designing the Teaching Progression for the Sound Topic Integrated with Context 1 Following the STS Model**

### **3.4. Designing the Teaching Progression for the Sound Topic Integrated with Context 2 Following the STS Model**

## **CONCLUSION OF CHAPTER 3**

Chapter 3 concretized the application of the C&S-integrated CBTL process following the STS model to cultivate students' responsibility toward C&S issues in the design of teaching the Sound topic – Natural Science Grade 7, with the objective of fostering students' responsibility toward the C&S issues of the Central Highlands region.

## **CHAPTER 4: PEDAGOGICAL EXPERIMENT**

Before conducting the Pedagogical Experiment (PE) with the designed teaching progressions for Context 1 and Context 2, we carried out a pilot program for exploratory purposes to inform the adjustment of the teaching progression, assessment tools, and to better understand the characteristics of the PE subjects in Context 1 (as the PE subjects for Context 1 are 100% Ê Đê ethnic minority, with a specific culture, unique language, and are a vulnerable population).

### **4.1. Pilot Program in EaKmar Hamlet (Buôn EaKmar)**

#### ***4.1.1. Pilot Subjects***

#### ***4.1.2. Pilot Implementation Progression***

The program was conducted in EaKmar Hamlet, a village where 350 households of the Ê Đê ethnic minority reside. The stages of the program are presented in Table 4.2.

#### ***4.1.3. Pilot Results***

#### ***4.1.4. Discussion of Field Program Results***

#### ***4.1.5. Adjustments to the Teaching Progression, Assessment Tools, and Assessment Methods for the Pedagogical Experiment***

Adjustments to the Teaching Progression: Based on the results of the pilot program in EaKmar Hamlet, we made detailed adjustments

to the teaching and learning activities, which are presented in detail in Table 2.9.

Adjustments to Assessment Tools and Methods: Using the local indigenous language in interviews and utilizing students' drawing abilities.

## **4.2. Purpose, Subjects, and Scope of the Pedagogical Experiment**

4.2.1. Purpose of the Pedagogical Experiment

4.2.2. Scope and Subjects of the Pedagogical Experiment

## **4.3. Pedagogical Experiment Integrated with Context 1**

### ***4.3.1. Development of Assessment Tools for Pedagogical Experiment Results (Context 1)***

*a. Checklist; b. Interview Questionnaire; c. Test.*

### ***4.3.2. Data Collection Implementation Plan during the Pedagogical Experiment (Context 1)***

### ***4.3.3. Data Processing Method (Context 1)***

### ***4.3.4. Pedagogical Experiment Results (Context 1)***

#### ***4.3.4.2. Quantitative Results***

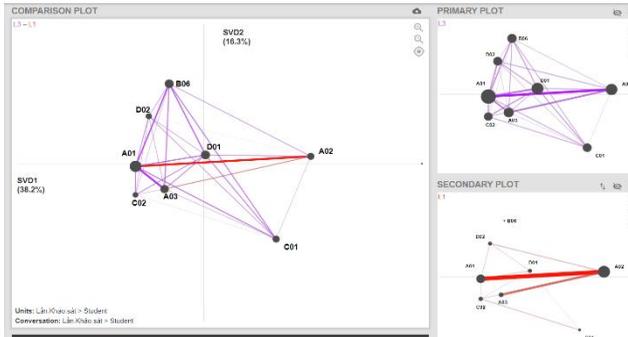
a. Simple Data Classification Results We coded 276 discourse segments obtained from 6 students through two interviews (the discourse segments and coding data are presented in Appendix 19), then jointly checked the inter-rater agreement. After each comparison of results, the process of parallel coding for differing segments was repeated until the agreement level exceeded 90%.

b. Results of Inter-Rater Agreement Assessment via Cohen's Kappa Statistic According to the guidelines of the ENA method (Appendix 18), all Cohen's Kappa values exceeded 0.89, so the coding

agreement was evaluated as good. All codes appeared with a frequency greater than 1%, so no codes were eliminated.

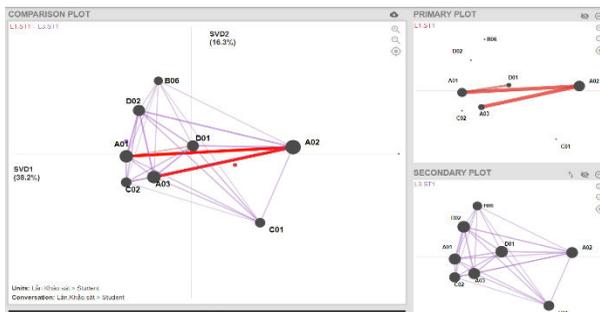
c. Results via ENA Network Diagram Analysis

### Comparison of Network Diagrams Obtained from the Group of 6 Students in Two Interviews (L1 and L3)



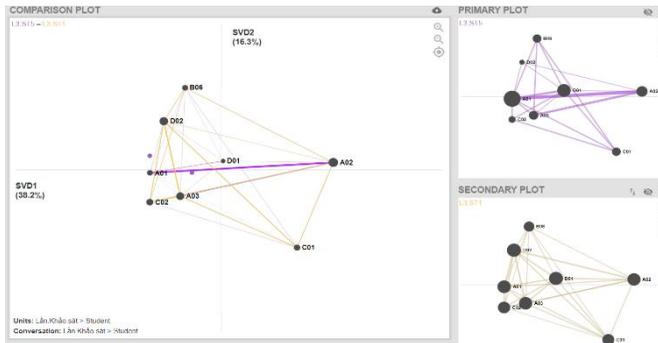
*Figure 4.12. Diagram Comparing the Network Structure of the Group of 6 Students across two Interviews (L1 and L3).*

### Comparison of Network Diagrams Obtained from Each Student in Two Interviews (L1 and L3)



*Figure 4.13. Diagram Comparing the Network Structure of ST1 across two Surveys (L1 and L3).*

## Comparison of Network Diagrams Obtained from the Student with the Highest Test Score (ST1) and the Student with the Lowest Test Score (ST5) in Interview L3



**Figure 4.15. Diagram Comparing the Network Structure of ST1 and ST5 in Interview L3.**

### 4.4.2. Data Collection Implementation Plan during the Pedagogical Experiment (Context 2)

### 4.4.3. Data Processing Method

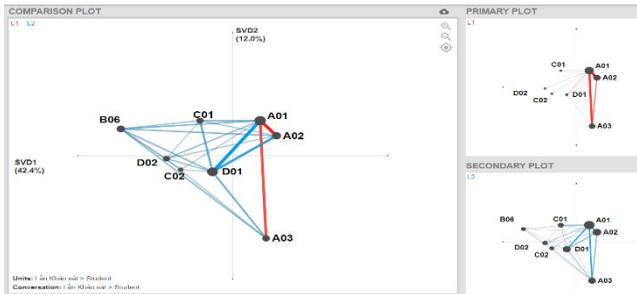
### 4.4.4. Pedagogical Experiment Results (Context 2)

#### A. Qualitative Results

Observing the Checklist results, it can be seen that students ST2-BC2 and ST5-BC2 had higher assessment scores compared to other students, with no criteria rated at level 1 or 2. Conversely, students ST32-BC2 and ST29-BC2 had high scores at level 2, accounting for 9/14 of the total assessment criteria.

#### B. Quantitative Results

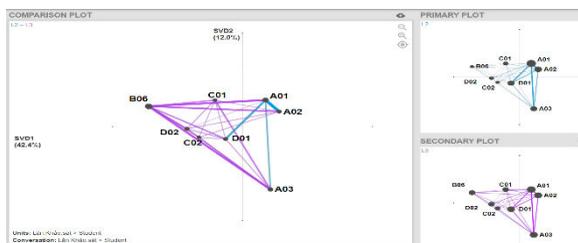
## Comparison of Network Diagrams Obtained from the Group of 33 Students in Two Surveys (L1 and L2)



**Figure 4.25. Diagram Comparing the Network Structure of the Student Group across two Surveys (L1 and L2).**

Based on the network diagram (Figure 4.25), the development of students' responsibility from the first survey (L1) to the second (L2) can be observed.

## Comparison of Network Diagrams Obtained from the Group of 33 Students in Two Surveys (L2 and L3)



**Figure 4.26. Diagram Comparing the Network Structure of the Student Group across two Surveys (L2 and L3).**

Context 2 (BC2) allowed students not only to understand but also to effectively apply the concepts.

#### **4.4.5. Results Obtained from Test Assessment (Context 2)**

The statistical data from Context 2 provided compelling evidence that the C&S-integrated CBTL method following the STS model had a significantly positive impact on students' academic achievement. The difference in average scores between the experimental class and the control classes, along with Cohen's *d* effect sizes at medium and large levels, confirms that this method is not only effective in cultivating the quality of responsibility but also contributes to improving learning outcomes. This demonstrates that when learning is connected to meaningful, real-world issues, students have higher learning motivation, thereby improving both knowledge and skills.

#### **4.5. Discussion on the practical sustainability and effectiveness of the proposed teaching process.**

### **CONCLUSION OF CHAPTER 4**

Chapter 4 presented the process of implementing the Pedagogical Experiment (PE) to verify the scientific hypothesis of the study. Specifically, it verified the effectiveness of the proposed C&S-integrated CBTL progression following the STS model in cultivating students' responsibility toward C&S issues.

### **CONCLUSION AND RECOMMENDATIONS**

Based on the process of theoretical study, practical survey, and pedagogical experimentation, the dissertation has achieved its stated objectives and made significant contributions to the field of C&S-integrated Context-Based Teaching and Learning (C&S-integrated CBTL) following the STS model.

#### **1. Key Achievements**

A. Theoretical and Practical Foundation:

The dissertation systematized and developed the theoretical foundation of C&S-integrated CBTL following the STS model, including the definition, principles for context selection, and teaching design process.

A structure of students' responsibility toward C&S issues was constructed and standardized through multiple steps, including 4 components and 14 behavioral indicators, creating a highly valid and reliable assessment tool.

A survey of the current situation involving 1281 students (SS) and 54 teachers (Ts) in LSS in the Central Highlands clarified the gap between awareness and action in responsibility education, providing a basis for designing and experimenting with the new teaching model.

#### B. Teaching Design:

The dissertation proposed a process for designing and organizing the teaching of the "Sound" topic (Natural Science 7) following the STS model, integrating two specific contexts in the Central Highlands: (1) preservation of traditional musical instruments of indigenous ethnic groups and (2) reducing noise influence from swiftlet farming houses.

Assessment tools for students' responsibility in each context were developed, based on the standardized theoretical structure, ensuring scientific rigor and practical feasibility.

#### C. Pedagogical Experiment:

The experimental results in both contexts provided compelling empirical evidence, showing that C&S-integrated CBTL following the STS model is clearly effective in cultivating students' responsibility.

Simultaneously, the test results indicated that this method did not reduce students' academic achievement, but even had a significantly positive impact, refuting initial concerns from Ts that integrating C&S factors might negatively affect academic outcomes.

The study effectively applied the case study method combined with qualitative and quantitative assessment tools, enriching research approaches in education.

## **2. Limitations of the Dissertation**

Despite its significant results, the dissertation has some limitations that should be addressed in future research: Scope of Study: The dissertation focused only on one topic ("Sound") and two specific contexts in some LSS in the Central Highlands. Therefore, the conclusions may not be representative of other diverse C&S contexts nationwide; Research Duration: The experiment lasted 5 weeks, which was sufficient to record initial changes but is not long enough to assess the long-term impact of the method on the formation and maintenance of students' quality of responsibility; External Factors: The research results might be influenced by external factors such as support from the community, parental involvement, or students' previous learning experiences, which the dissertation could not fully control.

## **3. Recommendations and Conditions for Implementation**

Based on the research findings and the stated limitations, the dissertation offers several recommendations and suggests necessary conditions for effectively expanding the application of this model:

### **A. For Educational Institutions and Training Centers:**

Specialized training programs and workshops should be organized for Ts on how to design and organize teaching according to

the STS model, focusing on naturally and systematically integrating C&S issues into lessons. Encourage Ts and SS to conduct applied pedagogical science research projects at the school and local levels. This not only gives Ts opportunities to experiment with new teaching models but also creates rich databases of local contexts.

#### B. For Extended Research:

The research scope needs to be expanded to other subjects and topics, especially in regions with distinct cultural characteristics (e.g., coastal areas with fishing culture, the Mekong Delta with riverine culture) to test and adjust the model accordingly.

Conduct longitudinal studies over a longer period to assess the sustainability of the quality of responsibility and its impact on students' future attitudes toward life and career choices.

#### C. Conditions for Effective Implementation:

**Multi-dimensional Collaboration:** Successful implementation of this model requires close cooperation among schools, Ts, SS, and especially management agencies, local authorities, and the community (e.g., artisans, cultural organizations). Community support is a key factor in making learning contexts vivid and practically meaningful.

**Resources and Facilities:** Investment is needed in diverse learning resources, simple experimental equipment, and out-of-classroom learning spaces such as community houses, cultural centers, or real-life locations for students to gain direct experience.

**Curriculum Flexibility:** Educational administrators need to create flexibility in the curriculum and teaching plans, allowing Ts sufficient time and space to design, organize, and assess context-based learning activities.