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Challenges and Student-Proposed Solutions in Developing Collaborative Competence in High School Biology: A Study in Can Tho, Vietnam

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ABSTRACT: This qualitative survey explored the challenges faced by 1,373 high school students in Can Tho City during group work in Biology classes, their resolution strategies, and their proposed improvements. From 671 valid responses identifying difficulties, the most prevalent issues included disagreements in opinions (29.06%), unequal task distribution and responsibility (24.29%), and communication barriers (16.69%). Among these, 213 students suggested solutions, most commonly through discussion and active listening (38.50%). Regarding enhancement proposals, 356 valid responses emphasised improving instructional content and methods through practical experiments and technology integration (13.77%). The findings indicate a strong need for structured group protocols, teacher facilitation, and resource enhancement to foster collaborative competence. Recommendations include integrating cooperative learning models into the curriculum, providing targeted teacher training, and building students' collaborative skills to optimise group-based learning in Vietnamese high school Biology education.

KEYWORDS: Biology education, cooperative learning, collaborative competence, challenges, high school students.

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Introduction

Cooperative learning has long been acknowledged as a practical pedagogical approach in science education, particularly in Biology, where collaborative tasks promote critical thinking, problem-solving, and interpersonal skills essential to scientific inquiry, (Johnson & Johnson, 2018). In Vietnamese high school education, group work is increasingly integrated into the Biology curriculum to align with Vietnam's 2018 General Education Program, which emphasises competency-based learning and designates collaboration as a key transferable competence (Ministry of Education and Training, 2018). Recent Vietnamese studies have underscored the potential of cooperative methods to enhance student engagement and competence in Biology, while also revealing persistent challenges such as insufficient teacher training and limited instructional resources (Pham & Phan, 2022; Tran, 2023; Trinh, 2019).

Previous studies have identified common barriers to practical group work in science education, including interpersonal conflicts, uneven task distribution, communication difficulties, and inadequate teacher support (Ajaja & Eravwoke, 2010; Chatila & Al Hussein, 2017; Driessen et al., 2024). In Vietnam, similar issues are evident, with research indicating that while cooperative learning promotes active participation in Biology classes, factors such as large class sizes, insufficient guidance, and the presence of uncooperative group members hinder its efficacy (Trinh, 2019). Moreover, local investigations reveal uneven student motivation and limited experiential integration, which affect the development of cooperative skills in high school Biology (Pham & Phan, 2022; Tran, 2023). While these issues are documented globally, there is limited empirical evidence on how Vietnamese high school students experience and address such challenges in Biology-specific group tasks. Student perspectives on improving collaborative activities remain underexplored, yet they are crucial for designing contextually relevant interventions (Shala & Pavlin, 2025).

This study examines the development of collaborative competence among high school students in Can Tho City through Biology group work, focusing on the difficulties encountered, strategies to overcome them, and student-generated proposals for improvement. The research aims to inform curriculum design, teacher training, and instructional practices by optimising collaborative learning outcomes in secondary science education, capturing qualitative insights from a large sample.

Research Aim and Research Questions

This study examines the development of collaborative competence among high school students in Can Tho City through Biology group work, identifying key difficulties, resolution strategies, and student proposals to enhance the effectiveness of collaborative learning and inform evidence-based pedagogical improvements.

The study's findings respond to the following research questions:

1. What are the primary difficulties high school students encounter in Can Tho City during group work in Biology, and how do they attempt to resolve them?

2. What suggestions do students propose to make group activities in Biology classes more effective?

Methodology

Research Design: The study employed a cross-sectional survey design, utilising open-ended qualitative questions to investigate the status and determinants of collaborative competence development among high school students through Biology group work in selected schools in Can Tho City.

Participants: A total of 1373 high school students currently enrolled in Biology classes at several public high schools in Can Tho City, Vietnam, participated in the study.

Data Collection: Qualitative data were gathered through a paper-based questionnaire distributed during regular class sessions. The instrument included two open-ended questions; responses were collected anonymously to encourage candid feedback, and all questionnaires were retrieved immediately after completion.

Data Analysis: Invalid responses (e.g., blank, "no difficulties," "I don't know," or irrelevant answers) were excluded, resulting in 671 valid responses for Question 1 and 356 for Question 2. Valid responses were manually coded and thematically categorised using Microsoft Excel 2021, following the six-phase framework proposed by Braun and Clarke (2006).

Research Results

The survey was conducted among 1373 high school students from selected schools in Can Tho City, focusing on their experiences with group work in Biology classes. Responses to the qualitative questions were analysed thematically, categorising valid answers after excluding invalid ones. This section presents the detailed findings for each question, including frequency distributions, percentages, and key thematic contents. Percentages for difficulties and solutions are calculated based on the valid responses, while proposals are reported relative to the total sample to highlight participation rates.

Difficulties

For Question 1 ("What difficulties do you encounter during group work? How did you resolve those difficulties?"), A total of 1373 responses were collected. After screening, 702 responses were deemed invalid due to being blank, irrelevant, or non-descriptive, resulting in 671 valid responses (48.87% of the total). These valid responses were thematically grouped into six categories of difficulties, reflecting the primary challenges students faced in collaborative Biology activities. The distribution indicates that interpersonal and structural issues dominate, with opinions and perspectives being the most frequently reported difficulty.

Table 1

Typical difficulties that students encounter when working in groups

Group of Solutions	Percentage (%)	Main Methods
Opinions & Perspectives	29.06	Disagreements, conflicts, or differences in opinions among group members; challenges in unifying ideas or synthesizing a common content outline for Biology tasks.
Division & Responsibility	24.29	Lack of proactivity or responsibility from some members; non-cooperation; uneven or unclear division of tasks; instances of sloppy or incomplete work affecting group outcomes.
Communication Skills	16.69	Shyness or difficulty in communicating ideas; lack of confidence when speaking or presenting; tendencies to be quiet; interpersonal frictions or relational discords within the group.
Knowledge & Competence	14.16	Insufficient background knowledge in Biology topics; difficulty understanding lesson content; challenges with complex material; struggles searching, filtering, or generating ideas from resources.
Time & Organization	4.47	Difficulties in coordinating a common schedule for group meetings; tendencies to work right up to deadlines; frequent late submissions of group assignments.
Others	11.33	Unclear explanations or guidance from teachers; shortages of necessary materials, facilities, or equipment for Biology group activities.

This subset illustrates students' adaptive strategies for resolving conflicts and optimising group performance (Table 2). These resolution strategies were categorised into six groups, showcasing a range of adaptive approaches from interpersonal negotiation to seeking external help. The most common strategy involved discussion and active listening, suggesting that students preferred dialogue-based conflict resolution.

Table 2

The solution students used to solve the problem

Group of Solutions	Percentage (%)	Main Methods
Discussion & Listening	38.50	Engaging in calm and frank exchanges; unifying through compromise or synthesis; using voting or decision-making processes to identify common ground.
Improve Organization	14.55	Reassign tasks more clearly based on individual strengths or abilities; remind or urge members to contribute; implement accountability measures such as penalties; opt for collective work sessions.
Self-Learning &	14.08	Personal efforts to become more open, active, or confident; practicing

Group of Solutions	Percentage (%)	Main Methods
Self-Improvement		communication and presentation skills; independent research using books, the internet, or AI tools; improving time management by preparing work in advance.
Seek External Support	12.21	Consulting teachers for guidance; seeking advice or help from knowledgeable peers or experts outside the group.
Group Support & Bonding	8.45	Taking initiative to integrate and participate; assisting or explaining concepts to struggling members; motivating the group; proposing neutral or mediating ideas; deferring to a group leader for decisions.
Others	12.21	Reviewing and editing content collaboratively; maintaining composure during conflicts; fulfilling personal duties minimally and then disengaging.

Proposals

For Question 2 ("What proposals do you have to make group activities in Biology classes more effective?"), One thousand three hundred seventy-three responses were gathered. A substantial portion, 1017 (74.07%), were invalid (e.g., blank, "no opinion," "don't know," or unrelated, such as "not studying Biology"). This resulted in 356 valid responses (25.93% of the total), which were thematically categorised into six groups. The proposals emphasise enhancements in teaching methods and group dynamics, with a notable focus on content and pedagogical improvements. Percentages are reported relative to the total sample to illustrate the overall engagement level, highlighting areas where student input was limited (Table 3).

Table 3

Student proposals for improving the effectiveness of group activities in biology classes

Group of Proposals	Percentage	Main Content
Organization & Division	4.52%	Establish clear and specific task assignments; form balanced or smaller groups for better manageability; set explicit goals or timelines for biology group work.
Improve Content & Methods	13.77%	Incorporating more hands-on practices, experiments, or real-life applications; integrating videos, technology, games, or multimedia; and diversifying activity formats to make Biology lessons more engaging.
Awareness & Personal Responsibility	2.92%	Encouraging self-motivation, proactivity, and positive attitudes; promoting preparation of lessons; fostering focus and commitment to individual duties within the group.
Interaction & Group Environment	2.99%	Promoting active listening and respect for diverse opinions; building friendliness, unity, and open communication; creating a relaxed and supportive atmosphere for discussions.

Group of Proposals	Percentage	Main Content
Evaluation & Encouragement	0.66%	Implement fair assessment criteria for group contributions and introduce incentives such as rewards or bonus points to motivate participation.
Facilities & Support	1.02%	Ensuring adequate facilities, tools, and equipment; leveraging technology, the internet, or digital resources to support Biology group activities.

Discussion

The findings highlight key barriers to collaborative competence in high school Biology group work in Can Tho, aligning with global and Vietnamese research. The most frequently reported challenges were disagreements in opinions (29.06%) and unequal task division or responsibility (24.29%), reflecting the interpersonal and structural complexities typical of cooperative learning environments (Shala & Pavlin, 2025). In Vietnam, large class sizes and dominant members exacerbate these conflicts (Trinh, 2019). Communication barriers (16.69%), knowledge gaps (14.16%), and time constraints (4.47%) further hinder collaboration, consistent with studies on science education (Chatila & Al Hussein, 2017). Resource shortages and unclear teacher guidance (11.33%) underscore systemic limitations, which are also echoed locally (Tran, 2023). Students' predominant resolution strategies, particularly discussion and active listening (38.50%), rely on dialogue-based problem-solving, which aligns with collaborative learning theory (Field, Marbach-Ad (Marbach-Ad et al., 2016). However, only 32% of those reporting difficulties offered resolutions, suggesting gaps in problem-solving training (Pham & Phan, 2022). Proposals focused on practical, technology-integrated activities (13.77%) and clear task structures (4.52%), supporting calls for more engaging instructional methods and equitable evaluation (Driessen et al., 2024). The high proportion of non-responses (74.07%) suggests potential disengagement or uncertainty regarding agency in classroom reform, underscoring the importance of promoting student agency in classroom collaboration. Overall, targeted curriculum design, teacher training, and resource support are essential to transform group work into an effective tool for building collaborative competence in Vietnamese Biology education.

Conclusions

This study examined challenges in developing collaborative competence among high school students in Can Tho through Biology group work. The main difficulties included disagreements in opinions (29.06%), unequal task division (24.29%), communication barriers, and knowledge gaps. While many students addressed these issues through discussion and active listening (38.50%), only about one-third proposed specific solutions, indicating limited training in problem-solving. Students emphasised the need for more practical, technology-integrated activities (13.77%), clearer organisation, and supportive learning environments. Overall, the findings highlight the importance of structured, student-centred group work. Strengthening teacher facilitation, experiential learning, and student motivation can foster collaborative competence and enhance learning outcomes in Vietnamese Biology education.

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