



Enhancing Self-Directed Learning in Natural Science: Insights from Secondary Teachers in Can Tho City, Vietnam

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ABSTRACT: This study explores the current status, influencing factors, and potential solutions for developing self-directed learning (SDL) competencies among junior secondary school students in Natural Science education in Can Tho City, Vietnam. A qualitative survey involving 30 Natural Science teachers was conducted using open-ended questions, and data were analysed through thematic analysis. Findings revealed that 70% of teachers recognised positive aspects of students' SDL, particularly in exploration and application (26.7%) and self-study skills (20%), although 26.7% reported student dependency on teacher guidance. Influencing factors included foundation knowledge (30.8%), learning motivation (30.8%), and multifaceted environmental conditions (43.3%). Proposed strategies emphasised experiential learning (25%), teacher guidance (25%), and family-school collaboration (14.3%). The study emphasises the importance of integrated, student-centred approaches to enhance self-directed learning competencies, thereby supporting Vietnam's ongoing educational reform and promoting greater student autonomy in Natural Science education.

KEYWORDS: Current status, Educational reform, Natural Science education, Self-directed learning, Student autonomy.

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Introduction

Self-directed learning (SDL) has become a key focus in contemporary education, fostering lifelong learning and adaptability among students. Within Natural Science education, SDL enables learners to take initiative, set learning goals, and engage actively with scientific concepts, enhancing their critical thinking and problem-solving abilities. In Vietnam, the national education reform agenda emphasises competency-based learning. SDL is recognised as a cornerstone for developing student autonomy, especially in subjects such as Natural Science at the junior secondary level (Nguyen, 2024). However, several challenges, including traditional teacher-centred pedagogies, limited instructional resources, and socio-cultural constraints, continue to hinder the development of SDL in Vietnamese classrooms (Mai et al., 2025).

In Can Tho City, located in the Mekong Delta, teaching Natural Science in junior secondary schools reflects opportunities and limitations. The region's socio-economic diversity and educational infrastructure influence students' self-learning practices (Huynh et al., 2023). Teachers play a pivotal role in fostering SDL through innovative approaches, such as experiential and project-based learning, which align with global trends in science education (Silva et al., 2024). Nevertheless, factors including students' foundational knowledge, learning motivation, family support, and school environment substantially affect their ability to self-learn (Dao et al., 2025). Understanding these dynamics is essential for designing effective pedagogical interventions that enhance SDL within the context of Vietnam's ongoing educational reforms (Luu, 2024).

Accordingly, this study aims to examine the current status of SDL among junior secondary students in Natural Science education in Can Tho City, identify the key influencing factors, and propose practical strategies to strengthen this competency. By surveying 30 Natural Science teachers, the research captures teachers' insights into existing strengths, challenges, and solutions for improving SDL. The findings are expected to contribute to the broader discourse on competency-based education in Vietnam and support policymakers and educators in aligning teaching practices with the demands of modern education systems.

Research Aim and Research Questions

The primary aim of this study is to investigate the current status, influencing factors, and proposed solutions for developing self-directed learning (SDL) competencies in Natural Science education among junior secondary school students in Can Tho City, Vietnam.

To achieve this aim, the study addresses the following research questions:

- (1) What are the main strengths in students' self-directed learning abilities in Natural Science, as teachers perceive?
- (2) What factors influence students' self-directed learning in Natural Science?

(3) What strategies do teachers propose to enhance self-directed learning in Natural Science?

(4) Which solutions are the most important and feasible for developing self-directed learning competencies among junior secondary school students?

Methodology

Research Design: This study employed a qualitative research design, utilising a survey with open-ended questions to explore teachers' perspectives on self-directed learning (SDL) in Natural Science among secondary students in Can Tho City (Creswell & Poth, 2016).

Participants: Thirty Natural Science teachers from junior secondary schools in Can Tho City were selected through purposive sampling to ensure school location and teaching experience variation. All participants voluntarily provided informed consent.

Data Collection: Data were gathered in October 2025 through a four-question survey focusing on the current status, influencing factors, and proposed solutions related to SDL. The survey was distributed in physical and digital formats (Huynh et al., 2023).

Data Analysis: Responses were analysed using thematic analysis, based on Braun and Clarke (2006) a six-phase framework. Data were manually coded and categorised using Microsoft Excel 2019 to identify recurring patterns and key themes.

Research Results

Current Status

The survey responses to Question 1, "According to you, what are the prominent strengths in the self-directed learning competencies of students in your Natural Science classes?", which inquired about the prominent strengths in students' self-learning capacity in Natural Science, revealed a predominantly positive outlook among the 30 teachers (Table 1). The majority (70%) highlighted positive strengths such as exploration, application, and self-study skills, indicating that many students demonstrate initiative in engaging with the subject matter. A small portion (3.3%) reported no notable strengths, suggesting minimal perceived autonomy in some classrooms. Meanwhile, 26.7% described mixed or conditional strengths, where students show initiative but often depend on teacher guidance. These findings suggest that while self-learning is evident, it is not uniformly strong across all students.

Table 1

Strengths in Self-directed learning in Natural Science

Category	Responses	Percentage
Positive Strengths (e.g., Exploration, Application, Self-Study)	21	70%
No Notable Strengths	1	3.3%
Mixed/Conditional (e.g., Dependency but Initiative in Some)	8	26.7%

Influencing Factors

Responses to Question 2 – “*In your opinion, what is the most significant factor influencing students’ self-directed learning competencies?*” – revealed diverse perspectives (Table 2). The largest group (43.3%) emphasised multifaceted influences involving family, school, and society, highlighting the interplay of external and internal factors. Motivation and goals were identified by 30% of teachers as key drivers, while foundational knowledge accounted for 13.3%. Family factors, self-awareness, and learning conditions were less frequently mentioned (6.7%, 3.3%, and 3.3%). These findings indicate that SDL development depends on a combination of environmental and personal elements rather than a single dominant factor.

Table 2

Most Influential Factors on Self-directed learning

Category	Responses	Percentage
Foundational Knowledge	4	13.3%
Motivation and Goals	9	30%
Family Factors	2	6.7%
Self-Awareness	1	3.3%
Learning Conditions	1	3.3%
Multifaceted (e.g., Family, School, Society)	13	43.3%

Proposals

Responses to Question 3 – “*What solutions or suggestions do you propose to enhance students’ self-directed learning competencies in Natural Science?*” – yielded 16 distinct answers (Table 3). Experiential and project-based learning, along with teacher guidance and skills training, each accounted for 25%, reflecting a preference for practical and supportive approaches to learning. Other suggestions included self-study and awareness (18.8%), motivation and interest (12.5%), creating an environment (6.3%), technology support (6.3%), and no specific proposals (6.3%).

Table 3

Suggested Solutions to Enhance Self-Learning in Natural Science

Category	Count	%
Experiential & project-based learning	4	25.0
Teacher guidance & skills training	4	25.0
Self-study & awareness	3	18.8
Motivation & interest	2	12.5

Environment creation	1	6.3
Technology support	1	6.3
None	1	6.3

Most Important and Feasible Solutions

Question 4 – “In your view, what is the most important and feasible solution currently available for developing self-directed learning competencies among junior secondary school students?” – received 14 responses (Table 4). Experiential and project-based learning, motivation and goal setting, and teacher guidance accounted for 21.4%, indicating balanced emphasis. Family-school collaboration was mentioned by 14.3%, while other solutions, such as self-management, innovative teaching, and self-study, were noted by 7.1% each.

Table 4

Most Important and Feasible Solution for Self-Learning Development

Category	Count	%
Experiential & project-based learning	3	21.4
Motivation & goal setting	3	21.4
Teacher guidance	3	21.4
Family-school collaboration	2	14.3
Others (self-management, innovative teaching, self-study)	3	7.1 each

Discussion

The survey of 30 Natural Science teachers in Can Tho City highlights key aspects of students’ self-learning competencies, influencing factors, and proposed solutions. The 70% reporting positive strengths, such as exploration and application, aligns with research on intrinsic motivation in science education (Li et al., 2023). However, 26.7% of mixed strengths indicate a dependency on teacher guidance, a challenge noted in Vietnam’s teacher-centred pedagogy (Mai et al., 2025).

Multifaceted factors (43.3%), including family, school, and society, are the primary influences on SDL, reflecting Vietnam’s collectivist culture (Pham & Le, 2021). Motivation and goals (30%) align with self-determination theory, emphasising autonomous engagement (Hew et al., 2016). Foundational knowledge (13.3%) is critical, as weak prior skills hinder self-study (Kan’an & Osman, 2015). Family factors (6.7%) play a role but are often part of broader systemic dynamics (Nguyen et al., 2025).

Proposed solutions emphasise experiential and project-based learning (25% in Question 3, 21.4% in Question 4), supported by Huynh et al (2023) those who highlight its effectiveness in the Mekong Delta.

Teacher guidance (25% and 21.4%) is vital for scaffolding SDL (Luu, 2024), while motivation strategies (12.5% and 21.4%) foster engagement (Dao et al., 2025). Family-school collaboration (14.3%) and technology support (6.3%) address holistic needs, noting the growing role of digital tools (Nguyen, 2024).

Compared to Western studies prioritising self-efficacy (Arcoverde et al., 2022), Vietnam's context emphasises systemic factors (Tran et al., 2025). Experiential learning aligns with global trends (Silva et al., 2024), but resource constraints necessitate tailored solutions, such as teacher training (Nguyen & Do, 2024). The study's qualitative nature and small sample suggest future quantitative validation. Integrating project-based curricula and enhancing teacher support can advance SDL, aligning with Vietnam's reform goals (Pham & Tran, 2025).

Conclusions

This study examined self-directed learning (SDL) in Natural Science among junior secondary students in Can Tho City. Findings showed that most teachers recognised students' strengths in exploration and self-study, though many remained dependent on teacher guidance. Motivation, foundational knowledge, and socio-family factors were key influences on the decision. Teachers emphasised experiential learning, guidance, and family-school collaboration as feasible strategies. Strengthening teacher training and integrating project-based activities can effectively enhance SDL, supporting Vietnam's competency-based education reform.

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