

The teacher's competence in integrated teaching at secondary schools: A case study in Vietnam



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ABSTRACT

Integration of teaching is described as the systematic arrangement of knowledge in teaching to combine or unify matters of subject isolated in the academic curriculum. The purpose of this study is to investigate Vietnamese teachers, principals, and vice-principals in secondary schools' awareness and the implementation of integrated teaching in Natural Science subjects in secondary schools, Hoc Mon District, Ho Chi Minh City, Vietnam. Participants completed survey questionnaires about the awareness about objectives for fostering quality integrated teaching, the objectives' importance in integrated teaching, and the implementation of integrated teaching of Natural Science subjects. The results revealed that the integrated teaching in integrated teaching of Natural Science subjects was highly trained and well-implemented by secondary school teachers. The educational curriculum assists students in discovering, investigating comprehensive solutions, and examining various aspects of problems.

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1. Introduction

The method or strategies for achieving success in teaching which have been encouraged in secondary education are connecting the academic knowledge with real-life situations of students, integrating knowledge of different subjects, and creating rich tasks that allow for various methods and responses, have the potentials to enhance students' skills, encourage collaboration and discussion (Hattam and Prosser, 2006). Integration of teaching is described as the systematic arrangement of knowledge in teaching to combine or unify matters of subject isolated in the academic curriculum (Joglekar et al., 1994). Many real-life problems can be solved entirely if we know how to apply integrated knowledge effectively and systematically. Therefore, Natural Science subjects in schools have to be taught with integrated contents through different methods. The benefits of integrated content in the educational curriculum help students discover, investigate comprehensive solutions, and examine various problems. The integrated approach is a teaching

method that (i) allows learners to engage in purposeful and relevant learning, (ii) encourages them to see the interconnectedness, juxtapositions, and interrelationships between the curriculum areas, and (iii) enables students to work in preferred fields and promotes a more expansive perspective (Tytler et al., 2011).

Schools have applied an integrated curriculum to make education more appropriate for students' needs, create and keep students' interests in learning (Kain, 1993). The integrated educational curriculum has five primary features, which are (i) systematic examination or research on a variety of disciplines; (ii) flexible schedules; (iii) a group of qualified teachers plan lessons and teach a certain amount of students together; (iv) student-centered learning with educational programs, instructional approaches, and strategies focusing on students' individual needs, aspiration and interests; (v) high levels of student-students, teacher-student interactions (Venille, 2004). The effective implementation of an integrated curriculum in science subjects is influenced by several factors, including experiences obtaining through practicing and developing professional competency, planning courses in detail and systematically, preparing lesson content accurately with knowledge related to the educational curriculum of teachers (Huntley, 1998; Knudsen, 1937; Leung, 2006; Palmer, 1991).

Many researchers worked on the awareness of educators and the implementation of integrated

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teaching in Vietnam (Dang and Tran, 2018; Tran et al., 2016). They have concluded that teachers had great awareness about the importance of integrated teaching. However, they did not have extensive knowledge about educational content in integrated teaching. The researchers also reported that the forms, assessment, and techniques assisting in designing educational curriculum when applying integrated teaching were quite limited. In Vietnam, Natural Science subjects including Chemistry, Physics, and Biology were integrated to some extent (Bui et al., 2014; Le and Nguyen, 2017; Nguyen and Dinh, 2016). However, there is limited research focusing on the implementation of integrated teaching in Natural Science subjects in secondary schools in Vietnam. To bridge this gap, this research is conducted to assess educators' awareness and the implementation of integrated teaching in Natural Science subjects in secondary schools, Hoc Mon District, Ho Chi Minh City in Vietnam. The research starts with reviewing the empirical literature of the integrated curriculum and teaching in schools. A research methodology is introduced in the second section, followed by results and discussion. The last section is the conclusion.

2. Methods

2.1. Participants

The convenience sampling method was chosen to recruit the samples who volunteered to help with the study and administer it. The survey instrument was distributed to 200 Vietnamese participants of six secondary schools located in Hoc Mon District, Ho Chi Minh City, Vietnam. One hundred seventy-six questionnaires were returned for an 88 percent return rate, which exceeds the 30 percent response rate most researchers require for analysis. The sample of this study was drawn from 176 respondents who completed the survey instrument. Of these, 153 (86.9%) were biology, chemistry, and physics secondary teachers, 12 (6.8%) were heads of the secondary school subject, and 11 (6.3%) were secondary school principals and vice-principals. All

participants were provided informed consent before participation and explained the purpose of the research. The ethics committee approved the research of Ho Chi Minh City University, Vietnam.

2.2. Measure

In this cross-sectional study, questionnaires were designed to survey the teacher's competence in integrated teaching at secondary schools. This research started in January 2020 and finished in July 2020. First, In the first part of the questionnaire, some socio-demographic questions were used in order to detect participants' demographic features. The participants' responses are provided in five different levels based on a five-point Likert scale. The Statistical Package for the Social Sciences (SPSS) version 20 was used for data analyses. The coding procedure was based on a five-point Likert system, as follows: 1=Very Unimportant, 2=Unimportant, 3=Neither Important nor Unimportant, 4=Important, and 5=Very Important (Huang et al., 2018). According to Malhotra and Birks (2007), the five-point Likert scale's interval width should be computed to set up the group boundary value for result discussions.

3. Results

The mean scores of eight items about the awareness about objectives for fostering quality integrated teaching of Natural Science subjects of teachers, principals, and vice-principals in secondary schools are shown in Table 1. The internal consistency reliability estimate for this sample was 0.946. Among the eight items of the awareness about objectives for fostering quality integrated teaching of Natural Science subjects of teachers, principals and vice-principals in secondary schools, the indicator that has the highest score is Having extensive knowledge about integrated teaching of Natural Science subjects ($M=3.74$, $SD=0.44$). The indicator that has the lowest score is Improving teacher quality of Natural Science subjects ($M=3.24$, $SD=0.428$).

Table 1: The awareness about objectives for fostering quality integrated teaching of natural science subjects of teachers, principals, and vice-principals in secondary schools

No	Contents	M	SD	Order
1	Comprehending the opinions of building the Natural Science curriculum.	3.61	0.490	4
2	Having extensive knowledge about Natural Science.	3.73	0.445	2
3	Having extensive knowledge about integrated teaching of Natural Science subjects.	3.74	0.440	1
4	Having the ability to search and use information effectively.	3.56	0.498	5
5	Having the abilities to solve the problems related to the science of Natural Science subjects.	3.52	0.501	6
6	Having the ability to combine theory and practice in integrated teaching of Natural Science subjects.	3.39	0.489	7
7	Having the ability to examine and evaluate accurately in integrated teaching of Natural Science subjects.	3.61	0.489	3
8	Improving teacher quality of Natural Science subjects.	3.24	0.428	8

The mean scores of seven items about evaluating the objectives' importance in integrated teaching of Natural Science subjects for secondary school teachers are shown in Table 2. The internal consistency reliability estimate for this sample was 0.950. Among the seven items of the survey questionnaire, the indicator that has the highest

score is Contributing to build a cultural environment for learning and recreation of students ($M=3.63$, $SD=0.485$). The indicator that has the lowest score is Assisting students in forming and developing the abilities and skills such as solving problems, communication, reading comprehension, calculation ($M=3.24$, $SD=0.428$).

Table 2: The evaluation of the objectives' importance in integrated teaching of natural science subjects for secondary school teachers

No	Contents	M	SD	Order
1	Assisting students in applying knowledge, skills, attitudes, and personal experiences to act appropriately and effectively in real-life situations.	3.54	0.500	4
2	Assisting students in forming and developing the abilities and skills such as solving problems, communication, reading comprehension, calculation.	3.24	0.428	7
3	Organizing activities to form and develop students' virtues and competencies to solve problems appropriately and effectively in real-life situations.	3.60	0.492	2
4	Assisting students in improving the ability to create new products related to Natural Science.	3.49	0.501	5
5	Assisting students in discovering potentials and developing personal competencies.	3.56	0.498	3
6	Contributing to building a cultural environment for the learning and recreation of students.	3.63	0.485	1
7	Assisting students in combine learning and real-life situations,	3.38	0.485	6

The mean scores of thirty items about implementing integrated teaching of Natural Science subjects in secondary schools in Hoc Mon District, Ho Chi Minh City, Vietnam are shown in Table 3. The internal consistency reliability estimate for this

sample was 0.941. The scale "The implementation of integrated teaching of Natural Science subjects in secondary schools" has four subscales, including "Contents," "Form," "Method," and "Evaluation."

Table 3: The implementation of integrated teaching of natural science subjects in secondary schools in Hoc Mon District, Ho Chi Minh City

No	Integrated teaching of Natural Science subjects	The level of implementation		
		Mean	SD	Order
1. The Contents in integrated teaching of Natural Science subjects				
1.1	Substances and transformation of substances	3.38	0.487	4
1.2	Living organisms	3.51	0.501	1
1.3	Energy and transformation	3.49	0.501	2
1.4	The Earth and sky	3.46	0.499	3
	MEAN		3.46	
2. The form of integrated teaching of Natural Science subjects				
2.1	Teaching in a classroom with a lesson plan.	3.58	0.495	3
2.2	Teaching on school campus.	3.48	0.501	5
2.3	Organizing visiting and teaching outside the school.	3.40	0.490	6
2.4	Teaching online.	3.60	0.492	2
2.5	Combining teaching online and offline.	3.68	0.468	1
2.6	Private Teaching for students.	3.48	0.501	4
2.7	Flipped classroom.	3.39	0.488	7
	Mean		3.51	
3. The method for integrated teaching of Natural Science subjects				
3.1	Solving problems.	3.43	0.496	6
3.2	WebQuest	3.74	0.440	1
3.3	Projects	3.47	0.500	5
3.4	Hans-on	3.51	0.501	4
3.5	Doing scientific research	3.33	0.470	7
3.6	Group learning	3.67	0.471	3
3.7	Conducting experiments.	3.73	0.445	2
	Mean		3.55	
4. The assessment of integrated teaching in Natural Science subjects				
4.1	Constructed-response test.	3.79	0.412	3
4.2	Multiple-choice questions.	3.83	0.381	2
4.3	Essay	3.26	0.440	12
4.4	Report	3.51	0.501	10
4.5	Oral exam	3.52	0.501	8
4.6	Interview	3.48	0.501	11
4.7	Students give a speech in class.	3.63	0.485	5
4.8	Observing students conducting experiments.	3.72	0.453	4
4.9	Observing students when teaching outside the school.	3.84	0.368	1
4.10	Observing students doing scientific research or projects.	3.52	0.501	8
4.11	Assessing the results of the experiments.	3.54	0.500	7
4.12	Assessing the results of scientific research or projects	3.55	0.499	6
	Mean		3.60	

The mean score for the sample on The contents in integrated teaching of Natural Science subjects was 3.46. Among the four items of "Contents," the indicator with the highest implementation level is Living organisms (M=3.51, SD=0.501). The indicator that has the lowest level of implementation is the Substances and transformation of substances (M=3.38, SD=0.487). The mean score for the sample in the form of integrated teaching of Natural Science

subjects was 3.51. Among the seven items of "Form," the indicator that has the highest level of implementation is Combining teaching online and offline (M=3.68, SD=0.468). The indicator that has the lowest level of implementation is Flipped classroom (M=3.39, SD=0.488). The mean score for the sample on the method for integrated teaching of Natural Science subjects was 3.55. Among the seven items of "Method," the indicator that has the highest

level of implementation is WebQuest ($M=3.74$, $SD=0.44$). The indicator that has the lowest level of implementation is Doing scientific research ($M=3.33$, $SD=0.47$). The mean score for the sample on the evaluation in the integrated teaching of Natural Science subjects was 3.60. Among the twelve items of "Method," the indicator that has the highest level of implementation is Observing students when teaching outside the school ($M=3.84$, $SD=0.368$). The indicator with the lowest implementation level is Essay ($M=3.26$, $SD=0.44$), as shown in [Table 3](#).

4. Discussion

This research investigated the implementation of integrated teaching in integrated teaching of Natural Science subjects of secondary school teachers in Hoc Mon District, Ho Chi Minh City, Vietnam. The main findings reported that integrated teaching in integrated teaching of Natural Science subjects was highly trained and well-implemented by teachers, principals, and vice-principals in secondary schools. Specifically, teachers, principals, and vice-principals in secondary schools have great awareness about objectives for fostering quality integrated teaching of Natural Science subjects. The evaluation scores of the survey showed that most teachers, principals, and vice-principals in secondary schools comprehended the opinions of building the Natural Science curriculum, had extensive knowledge about Natural Science, and integrated teaching of Natural Science subjects. This result does not support previous research conducted by [Tran et al. \(2016\)](#), who revealed that teachers had great awareness about the importance of integrated teaching, but they did not have extensive knowledge about educational content in integrated teaching. To implement integrated teaching, teachers need to understand the knowledge of the integrated content in the educational curriculum, topics of natural science and comprehend the nature, design, and implementation of integrated teaching contents. Integrated teaching is the teaching trend to develop learning capacity, meeting the current requirements of educational innovation. Therefore, teachers are adequately aware of the importance of fostering integrated teaching capacity as a condition for the successful implementation of Natural Science ([Dang and Tran, 2018](#)). Integrated teaching assists the management staff in accessing the new curriculum and textbooks with flexible content. Besides, teachers, principals, and vice-principals in secondary schools also have the ability to examine and evaluate accurately in integrated teaching of Natural Science subjects. Examination and evaluation play essential roles in confirming the effectiveness of the integrated teaching process. Therefore, fostering quality integrated teaching has to pay attention to improving teachers' capacity in conducting tests and evaluations when teaching integrated knowledge of natural science.

The objectives of integrated teaching Natural Science subjects are generally considered to be

important. Specifically, teachers, principals, and vice-principals in secondary schools consider that contributing to building a cultural environment for students' learning and recreation is the most important objective of integrated teaching of Natural Science subjects. This result is directly in line with the previous conclusion of [Lizzio et al. \(2002\)](#) and [Shamaki \(2015\)](#), which reported that components of the learning environment affected, directly and indirectly, students' academic achievement. The evaluation scores of the survey showed that organizing activities to form and develop virtues and competencies for students to solve problems and assisting students in applying knowledge, skills, attitudes, personal experiences to act appropriately and effectively in real life and situations are the important objectives of integrated teaching of Natural Science subjects. Integrated teaching requires that learning in school have to be associated with real-life situations, so this teaching method becomes meaningful. Integrated teaching is reflected in not only the educational content but also educational activities. Teachers need to organize learning activities outside the classroom such as the experiment in the lab, practice in production, experiential activities,... to assist students in experiencing the realities of school life, family, society, and forming the essential virtue and general abilities. Assisting students in discovering potentials and developing personal competencies also is an important objective of integrated teaching of Natural Science subjects. Integrated teaching enables students to experience positive emotions and promote their creativity. Therefore, teachers have to choose attractive, practical, and open topics to stimulate students to come up with many accurate and valuable solutions in particular circumstances.

Teaching online, teaching in a classroom with a lesson plan, and combining teaching online and offline are integrated teaching of Natural Science subjects that teachers, principals, and vice-principals in secondary schools apply to teach integrated educational curriculum knowledge in secondary schools. Coordinating different forms of organizing classrooms based on an educational curriculum develops students' capacity, promotes positivity, and increases students' interest. Especially, teachers, principals, and vice-principals in secondary schools need to apply "Flipped classroom" to enhance students' self-study at home and prioritize solving challenging, complex problems when learning in the classroom.

The evaluation scores of the survey showed that most teachers, principals, and vice-principals in secondary schools usually assess students' learning and performance in integrated teaching of Natural Science subjects with a Constructed-response test, Multiple-choice questions, students' speech in class, observing students conducting experiments, and observing students when teaching outside the school. The assessment is considered to be strongly associated with the integrated teaching and learning process, so it should be implemented in a form that

provides meaningful feedback to both students and their parents. Classroom assessment is a part of the educational processes that both teachers, principals, and vice-principals in secondary schools frequently apply to provide accurate student achievement outcomes and examine the educational curriculum's efficiency (Banta and Palomba, 2014). Teachers, principals, and vice-principals in secondary schools frequently apply many different methods to enhance assessment activities' accuracy and motivate students to participate in learning activities, and improve learning outcomes. Besides, teachers also use many methods to assess students' learning through experiential activities and products. The limitation of the present studies naturally is the sampling process used. The sample was drawn from Hoc Mon District in Ho Chi Minh City, Vietnam.

5. Conclusion

Integrated teaching is described as the systematic arrangement of knowledge in teaching to combine or unify matters of subject isolated in the academic curriculum. The benefits of integrated content in the educational curriculum help students discover, investigate comprehensive solutions, and examine various problems. The main findings that can be drawn are that the integrated teaching in integrated teaching of Natural Science subjects was highly trained and well-implemented by teachers, principals, and vice-principals in secondary schools. All results obtained from this research are necessary for managing the implementation of integrated teaching and educational curriculum for Natural Science subjects in secondary schools. Besides, these findings provide additional information about the teachers, principals, and vice-principals in secondary schools, the objectives, contents, and methods that influence the quality of integrated teaching of Natural Science subjects. Future research on integrated teaching of Natural Science subjects might extend the explanations of the effects of the above factors on the quality of integrated teaching and educational curriculum.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

- Banta TW and Palomba CA (2014). *Assessment essentials: Planning, implementing, and improving assessment in higher education*. John Wiley and Sons, Hoboken, USA.
- Bui TG, Tran TN, and Vu TY (2014). Giáo dục tích hợp môi trường thông qua dạy học theo dự án [Education integrates the environment through project-based teaching]. *Vietnam Journal of Education*, 335: 57-59.
- Dang TKL and Tran KD (2018). Thực trạng năng lực quản lý hoạt động dạy học tích hợp ở các trường tiểu học khu vực Đồng Bằng Sông Cửu Long [The current situation of integrated teaching activity management in the primary schools in Mekong Delta]. *Vietnam Journal of Education*, 6: 21-26.
- Hattam R and Prosser B (2006). Connecting curriculum with student life worlds. In the 3rd International Middle Years of Schooling Conference, Adelaide, Australia.
- Huang ST, Tran-Chi VL, and Hsiao TE (2018). An exploration of the development of Vietnamese children's self-control ability. *Problems of Education in the 21st Century*, 76(3): 309-317. <https://doi.org/10.33225/pec/18.76.309>
- Huntley MA (1998). Design and implementation of a framework for defining integrated mathematics and science education. *School Science and Mathematics*, 98(6): 320-327. <https://doi.org/10.1111/j.1949-8594.1998.tb17427.x>
- Joglekar S, Bhuiyan PS, and Kishore S (1994). Integrated teaching-Our experience. *Journal of Postgraduate Medicine*, 40(4): 231-232.
- Kain DL (1993). Cabbages—and kings: Research directions in integrated/interdisciplinary curriculum. *The Journal of Educational Thought (JET)/Revue de la Pensée Educative*, 27: 312-331.
- Knudsen CW (1937). What do educators mean by integration? *Harvard Educational Review*, 7(1): 15-26.
- Le TH and Nguyen VĐ (2017). Vận dụng phương pháp dạy học theo trạm vào tổ chức dạy học chủ đề tích hợp "Nhiệt độ và Sự sống" (Vật lý 10) theo hướng bồi dưỡng năng lực giải quyết vấn đề cho học sinh [Applying stationary teaching method to teaching organization of integrated topic "Temperature and Life" (Physics 10) towards fostering problem solving capacity for students]. *Vietnam Journal of Education*, 10: 189-193.
- Leung WLA (2006). Teaching integrated curriculum: Teachers' challenges. *Pacific-Asian Education Journal*, 18(1): 88-102.
- Lizzio A, Wilson K, and Simons R (2002). University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice. *Studies in Higher Education*, 27(1): 27-52. <https://doi.org/10.1080/03075070120099359>
- Malhotra N and Birks D (2007). *Marketing research: An applied approach*. 3rd Europe Edition, Pearson Education, Harlow, UK.
- Nguyen MD and Dinh HP (2016). Phát triển năng lực dạy học cho giáo viên thông qua xây dựng chủ đề tích hợp "Protein-Nguồn dưỡng chất thiết yếu" [Developing teaching capacity for teachers through building integrated topic "Protein-Essential nutrient source"]. *Vietnam Journal of Education*, 10: 112-115.
- Palmer JM (1991). Planning wheels turn curriculum around. *Educational Leadership*, 49(2): 57-60.
- Shamaki TA (2015). Influence of learning environment on students' academic achievement in mathematics: A case study of some selected secondary schools in Yobe State-Nigeria. *Journal of Education and Practice*, 6(34): 40-44.
- Tran TN, Nguyen QC, and Dang TTA (2016). Thực trạng nhận thức về dạy học tích hợp các môn khoa học tự nhiên ở một số trường đại học sư phạm [Awareness of teaching integrating natural sciences subjects in some pedagogical universities]. *Vietnam Journal of Education*, 387: 55-57.
- Tytler R, Darby L, and Peterson S (2012). Movement and force. In: Skamp K and Preston C (Eds.). *Teaching primary science constructively*: 99-142. 4th Edition, Cengage Learning, Melbourne, USA.
- Venville G (2004). Integration of science with other learning areas. In: Venville G and Dawson V (Eds.), *The art of teaching science*: 146-161. Allen and Unwin, Crows Nest, Australia.