

# Devise Integrated Theme Assignment Oriented to Ability Development and the Application of Knowledge in Realistic Problem Solving for Secondary School Student

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**Abstract** During the last decade, integrated studies has been practiced in many nations with developed education system. In Vietnam, the traditional teaching practice is having its weaknesses exposed, as it has to face a great knowledge boom, as many global problems are emerging that needs to be in the school curriculum and be taught to children, but not being exclusive to the knowledge and thought process of any individual subject or science. Thus, integrated studies is also one of the crucial orientation necessary for a fundamental, thorough innovation of the education system in Vietnam in the upcoming period. This paper will present the topic of devising integrated theme assignment with a view to develop the ability to apply knowledge in realistic problem solving for students in secondary schools. In order to build the integrated theme assignment, the author based on the scientific reasoning: To overcome the limitation of using the current curriculum as well as to serve the need for innovation in education at the Secondary level in the upcoming period; to develop the ability to apply knowledge to realistic problem solving for the students is the objective of teaching and is also the directive idea in the building of new secondary school curriculum; Divising integrated theme assignments is to serve the purpose of organizing the study in a way that help students develop the ability to apply knowledge to realistic problem solving. Based on its identification and general characteristics such as its suitability, multi-subject and intersubject, reality; we have named the principle in building and modeling the structure of a integrated theme assignment to use as an illustrative example of building integrated theme assignment in the current secondary school curriculum. This study represents the efforts in finding a way to improve the currently teaching quality following the integrative orientation to fit the present context : the curriculum and the learning facilities as well as the quality of teachers, students and the managerial condition of the secondary schools.

**Keywords:** *integration, ability, knowledge application, realistic problem solving, integrated theme assignment*

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## 1. Introduction

In reality, the quality of curriculum and teaching in our country still have many notable issues. As the evaluation report on the current curriculum and mandatory textbook of the Ministry of Education and Training [1,2] pointed out “*the general education curriculum ... is still overly focusing on knowledge, while neglecting the formation and development of student’s ability and personality*”. Many limitation of the current curriculum was pointed out, such as “*overload, over-academic, lack practice, unrealistic*”. The Ministry of Education and Training has recently issued the “*General education curriculum – general curriculum*” [3], which require the curriculum to help

developing the students’ ability and personality; give priority to practicing, application of the knowledge in solving problems in learning and in ordinary life; to develop the curriculum and to organize the teaching-studying in integrative fashion is to be the mainstream in Primary and Secondary level. Therefore, any addition, any adjustment to fix the limitation of the curriculum and the way it is executed in the school’s particular context is vital. In addition, academic, unrealistic character of the study knowledge in school cũng as well as the monotony in teaching forms and study activity do affect the students’ willingness to learn and hinder the students’ joy of going to school. Therefore, finding a way to enhance education quality is equal to renovating and innovating the current education practice, both in term of content and in term of teaching method . So, the issue would be: How to create

such changes given the current context of curriculum and learning facilities as well as the quality of teachers, students and the managerial condition of the secondary schools?

Studies on education [9-15] has point out that assigning to students a few assignments containing the general content of the lesson would be more effective than assigning many assignment focusing on narrow, divided section of knowledge. Integrated theme assignment is kind of assignment that focus on the fundamental, containing summarized information with wide scopes varied in level – also known as large assignment, which help the students solve realistic problems, give the students the initiative and force them to be responsible with their studies. According to Pretty [4] the large assignments give the students the opportunity to practice and apply their knowledge and skills; in the large assignments the students have the opportunity to use the higher thinking skill such as creating, problem solving, evaluating, summarizing and analyzing (*these characteristics will be the indicators to distinguish the large assignments with other types of exercise*). Doing the integrated theme assignment using the suitable method promoted the development of the student's general studying ability as well as the subject studying ability. Xavier (1996) [8] stated in the faculty of integrative education: to develop the student's ability, it is essential to let the students use the knowledge and skills, as well as to train positive attitude in solving particular situation/problem/ assignment; through using the suitable teaching method. Based on the analysis above, the paper will present the principles as well the structural model of integrated theme assignment; based on which we can devise differet types of integrated theme assignment in secondary school by organizing the study using theme-based teaching method to develop the students' ability to apply knowledge in realistic problem solving.

## 2. Content

### 2.1. The Basis of Building Integrated Theme Assignment is to Develop The Students' Ability to Apply Knowledge in Realistic Problem Solving

#### 2.1.1. Fix the limitation in the implementation of the current curriculum; meet the need for innovation in secondary level education in the upcoming period with a view to develop the students' ability

It is stated in Vietnam Education Law 2005 that "Secondary level education is meant to help the students retain and develop the result of primary level education; to reach the general qualification at secondary level and to accumulate knowledge on technical and career orientation to support the consequent studies in High school , vocational school or work life" – Article 27. Implementing the Communal decision no. 40/2000/QH10 of Congress and Directive no. 14/2001/CT-TTg of the Government Prime Minister, since the school year 2002–2003, the Ministry of Education and Training had ordered universal implementation of the

curriculum and new textbook in Primary school and Secondary school.

Until nowadays, some certain achievement has been made by secondary school education. However, the secondary school curriculum is currently over-emphasizing on the academic and theoretical aspects, which hinders the effort in teaching and learning scientifically and in developing students' ability to practice and apply knowledge in realistic problem solving. In 2008 and in 2016, the Ministry of Education and Training collected the opinions from the teachers, education management staffs [1,2] – the people who were directly working with the new textbook in 64 provinces of Vietnam, along with Vietnam Association of Former teachers, Vietnam Association for Promoting Education and Vietnam Union of Science and Technology Association to evaluate the currently used textbook curriculum. The Ministry concluded that there were overload to students and teachers; as well as the overrated of theoretical knowledge, and the lack of practice. In addition, the practice of teaching and studying at middle school level in our country is, in general, heavily influenced by examinations. That has led to the over-focus on teaching knowledge and training exam-taking skills and the lack of focus on teaching the students self-awareness and method of scientific deduction in the lesson; as well as on promoting the students' independent thinking and creativity existing in the curriculum: The teaching practice rarely involves encouraging students to explore or building up the students' practice skills and abilities. In other word, teaching way of thinking, the way to solve problems, the way to learn smartly, independently and creatively hasn't received edequate attention in current teaching practice .

The Ministry of Education and Training has recently issued the "General education curriculum – general curriculum" [3], the building principle of which was: the curriculum has to be capable of developing the people's qualities and abilities người học through the fundamental, practical, modern content with a healthy ratio of moral, intelligent, physical and artistic education; focus on practice and apply knowledge in realistic problem solving; highly integrated in lower levels while, and gradually divided in higher levels. At secondary school level in specific, it was stated that: The secondary school curriculum is meant to assist students in further developing the skills and abilities gained after primary education; adjusting themselves to match the society's standard, learning how to apply active learning method to complete the knowledge and fundamental skills; acquiring introductory knowledge about professions and sense of career orientation in for consequent studies in high school, vocational school or work life. In the Integrated Education Plan mentioned the teaching practice of Natural science subjects : Physics, Chemistry and Biology. For each subjects there are the guidelines to making study themes; integrating career orientation content into the lesson.

The evidences above shows that the demand for developing the students' ability to practice and apply the knowledge into realistic problem-solving is requiring the secondary schools to implement teaching and studying methods with integrative orientation before the new curriculum with such orientation is promulgated.

### 2.1.2. Developing the students' ability to practice and apply the knowledge into realistic problem-solving is the objective of teaching studying and the directive orientation in developing the new middle school education system

The ability to practice and apply the knowledge into realistic problem-solving is the student's individual ability to mobilize, and apply the knowledge, skills and attitude learnt in class or via real-life experience to solve problems emerging in various complicated situations.

It is written in the orientation for building middle school education curriculum for the upcoming period that we need to develop the learners' quality and ability, and focus on practice and apply the knowledge in real-life problem solving. Thus, even though the program mentioned the general ability (ability of independence and self-study, ability to communicate and cooperate, ability of problem-solving and creativity) and the subject ability (language ability, mathematics ability, social and science study ability, technology ability, Information technology ability, artistic ability, physical ability) but the final objective of the middle school curriculum is still to help the student obtain the basic knowledge, effectively apply the knowledge into real life and become capable of self-studying for lifetime.

By Developing the students' ability to practice and apply the knowledge into realistic problem-solving, we can help student:

- Fully understand the knowledge learnt to use them for solving assignments or for creating new content for the next lessons; become capable of connecting the knowledge with real-life problems related to science; apply the knowledge and skills into studying and real life; have the right attitude for studying, active, creative studying method, the desire for studying and knowledge and ability to self-study.

- Develop the ability to observe, gather, analyze and process information; develop method for scientific research; develop real-life research skill; develop the mindset to take initiative in solving real-life problems.

- Learn about the nature, its cycles, its positive and negative effects to human's life as well as human's influences onto nature. Through learning about the nature by using knowledge learnt, gain self-awareness and understand the consequence of their own acts, obtain a sense of responsibility toward family, school and the society at present as well as in the future.

- Experience the joy and the eagerness brought by studying practice. Develop the quality of active, independent and creative to overcome the difficulties and find joy in learning.

### 2.1.3. Integrated theme assignment is a form of fundamental assignment, containing information integrated in a various large scope with a view to develop the students' ability to practice and apply the knowledge into real-life problem-solving

In teaching in general and in secondary school teaching in particular, assignments play a crucial role [5,6,7]. Assignment is considered the mean to develop thinking ability for students through letting them actively do the steps, apply the learnt procedures to solve the assigned

task (from simple: simply redo the steps learnt in an identical situation, to complicated: apply steps into a different, more complicated situation). Assignment does not only help the students absorb events and information but also develop the thinking and explanatory ability for learners. It has become a crucial mean in developing logical, critical and creative thinking for students. Using assignment appropriately is a crucial factor in encouraging students to learn efficiently.

Research on integrative teaching and learning [7] shows that integrated theme assignment is highly attractive for students at primary and secondary level. The purpose of integrated theme assignments is to encourage students to combinationally use the skills and knowledge from 1 subject or from multiple different subjects, to see them in relationships with each other and see if they are practical. Thus, the teacher has to build exclusive assignment for each lesson to build integrated theme assignment that could cover many content in the study program. Many researches [5,7] show that integrated theme assignments are associated with reality, situational research and the making of a production that benefit students. On the other hand, integrated theme assignment is a measure to reduce the number of individual exercises in individual subjects.

## 2.2. Build Integrated Theme Assignments to Develop the Ability to Practice and Apply the Knowledge into Real-life Problem-solving for Secondary School Students

### 2.2.1. What is integrated theme assignment?

According to Vietnamese dictionary (1992) the word *assignment* has the literal meaning: "a number of tasks, or activities that students have to do to learn a certain skill and the teachers only provide instructions". Thus, assignment is a form of study tasks of the learner that once it's completed the learner would learn one skill or more. The point is, the concept of "assignment" emphasizes the activity of the learner without the teacher's "direction or control". In other words, assignment is the activities done by learners (alone or in groups).

*Integrated theme assignment* is a form of practice, research assignment, using the knowledge and themes from many subjects (with a main subject) or fields. This emphasizes, *firstly*, the concept of activity – *to do some activities* or task in the research process, study about themes related to real life. *Secondly*, the assignment is desired *in association with a theme* of a subject/field of study. This means there could be many assignments in one theme (in one field of study, in the main subject and the other subjects). *Thirdly*, integrated theme assignment is built friendly to learners and promote *the practice of research, explain and solve the problem. Here are some characteristics of an integrated theme assignment:*

- The assignment is *combinational* and consist of a number of sub-assignments (related to each other) the could be done by student alone or in small groups or the entire class and is not limited to one subject;

- Assignment is a *study and research task* (without providing more theories), based on the *already learnt knowledge and skills* that students have (individually or collectively) and the teacher is the person to assign the task (*with regard to the students selection of problem*) and the one to give instruction should the students need (ready to back up). Thus, to do assignment is to complete a study task to learn the way to perform an act. The point is, the result of the act of doing the assignment is to change in the people who do the assignment, not to change the objects that is used for the assignment;
- The assignment is associated with a theme, a *problem* in life that is familiar to the students. The assignment requires the students to study the *problems* from new aspects and discover new information, about which they have to express their thoughts, evaluation and personal feelings, to give critical, argumentative comments, and to make decisions, suggest solutions and the possible course of action to solve the problem (life science). Through the process of doing the assignment, students will be put in the situations where they can learn the skills and develop the quality of be active, creative cooperative with others, especially their peers.
- The result is the students will obtain the knowledge on some fundamental problems in the nature and social life context, to learn the skill of researching and acting as well as the positive, cooperative attitude to improve their livelihood.

### 2.2.2. Some basic characteristics of integrated theme assignment

#### a) Suitable for secondary school students

At this level, the student's learning motive is to study in a systematic way the scientific knowledge and to apply them in realistic problem solving; and from that basis form a new attitude toward the scientific knowledge system. Students at this age are converting from perceptive viewpoint to reasoning viewpoint. Also, at this age, the students start to have new learning motive related to their career orientation and self-awareness. For that reason, the integrated theme assignments are required to help navigating the students toward positive, active and creative learning practice; to expand their knowledge especially the ability to practice, and apply the knowledge into solving study-related and real-life problems.

#### b) Multi-subject and Inter-subject

Integrated theme assignments aim to solve realistic natural and social problems, which are complicated and not exclusive to any individual subjects. To achieve the general objective of the secondary school curriculum, the assignment will require the practice and the application of the other subjects' in the curriculum.

#### c) Practicality

The assignment features the problems in real-life to appeal to the students.

In this paper, the method of theme teaching and learning will be represented by giving the students the integrated theme assignment so that by doing the assignment, the students could develop the ability to apply the learnt knowledge into solving real-life problems.

### 2.2.3. The principle in building integrated theme assignment

The analysis of the students' learning process in this paper emphasized a few characteristics of the learners and the criteria of a adequate learning process. Beside that, the research also show that the practice of theme learning has advantages in developing logical and creative thinking. Of course, introducing the integrated theme assignment in schools still have to *partly* aim the enhancement of the curriculum implementation quality, which is to complete the objectives of the study level, the class and the subject and *also* to adjust the reality of schooling to be more suitable and fun, for the sake of the students' all-round development. Thus, the integrated theme assignment must be used based on the following principles:

*First*, integrated theme assignment must be built base on the selection of the knowledge units from the main subject as well as the related subjects. In reality, not every knowledge of every subjects and field could be used in building integrated theme lesson; only the units that are closely related to real-life problems familiar with the students, which they have to deal with frequently, should be covered in the integrated assignment.

*Secondly*, integrated theme assignments have to partly reinforce the knowledge and skills learn t in the main subjects as well as the other subjects. Which means that *the component assignments and the study tasks* have to be related to the main subjects; and at the same time, as an integrated subject, help the students develop the subject ability as well as the general ability... Thus, the *component assignments and study tasks* have to give the students activities, require them to perform the activities, the tasks (specific acts). In other words, *the component assignments and study tasks* in the integrated theme assignment are meant to help develop the ability through taking actions.

*Thirdly*, the component assignments and study tasks in the integrated theme assignment have to give the students the chance to work actively, independently and creatively to develop the student's ability. This, on one hand, require building a study environment that promote trust, sharing, cooperation, debate and learning from each other. In that way, personal opinion, thoughts, ideas (which could be impractical, sometimes) could be heard and respected. On the other hand, the assignments have to encourage them to practice the skills, to have the habit of thinking independently and creatively to solve problems. Therefore, the component assignment and study tasks have to stick to that study and development orientation during the process of doing the assignment.

*Fourth*, the analysis on theme teaching and learning poited out the combinationality of the study content. Thus, the integrated theme assignment also have to guaranteecūng its quality of combinational and multifaceted (multi-subject), which means it has to require the learner to use the many skills learnt from many fields to complete the assignment. For that reason, the integrated theme assignment cannot stand alonel ; it has to belong to a system or a group of subjects. It means it will take more time. In other world, the integrated assigments of each theme are related to each other.

*Lastly*, integrated theme assignment must retain the focus of the students in the process of doing it and help the students find joy in the learning process. The study

tasks have to include multiple activities, with many forms: Working alone, in pairs, in groups or the whole class; both in class and in extra curriculum...

**2.2.4. The structure of integrated theme assignment**

Building integrated theme assignment using the description of Xavier (1996) [8] of the way to achieve the integrate objective (p.125). According to the author (Xavier 1996) the most logical approach to build a comprehensive curriculum follow the integrative

orientation begins with the integrate objective, identify the abilites and other related objectives. This paper will focus on the theme and assume that each of the theme matches with one objective. From the integrate objective, identify the particular abilities. From the abilities, build the theme integrated assignment; each component assignment will have study tasks through which respective skills and knowledge will be develop.

The following model describ the structure frame of an assignment in a certain level of study.

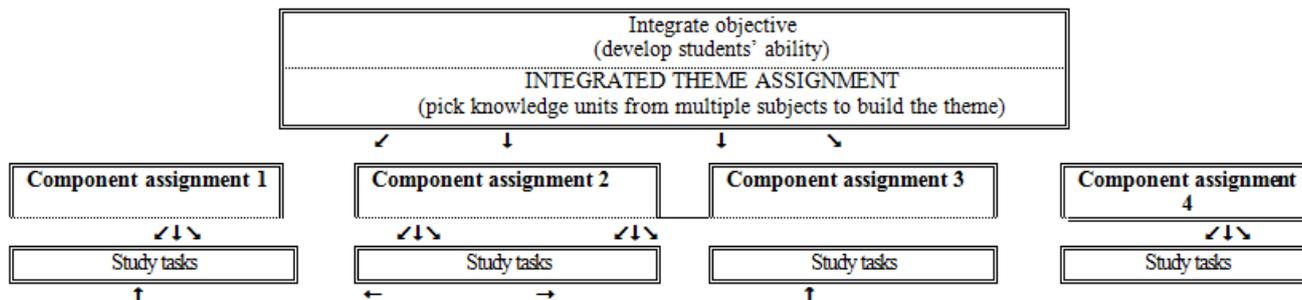


Figure 1.

As the analysis of theme learning and teaching pointed out, its content is always combinational. Thus, a theme has to consist of many component related to each other and related to many different fields. The assignments are closely related to each other to create a process: the learners are brought into the environment; the learners objectively observe the phenomenon or the event; the learners give subjective opinion of the event/phenomenon that their observed and share that opinion with the peers who also entered that environments and, an owner of the environment, actively evaluate and reshape it.

Each of the assignment, depends on the objects and objectives, will consist of the suitable study tasks (develop certain skills). Designing the tasks is a crucial step in building integrated theme assignment. *First*, the tasks has to be desgined in line with the content of multiple subjects including the main subjects and the other related subjects. Help form and develop particular skills required by the main subject as well as the related subjects and other general skills (observe, analyze, summarize, compare, comment, evaluate, express...). Thus, the tasks have to let students engage in activities with a view to develop the skill by performing the act. *Secondly*, the tasks have to provide the opportunity for students to work independently, actively and creatively. Peers become the

environment where they can share, cooperate, debate and learn from each other. Thus, students are encouraged to discuss with friends, with the entire class about their opinion and thoughts, present and explain what they have done với các em làm, evaluate themselves. *Third*, to maintain the focus of the students during the process of performing the tasks and to help students find joy in studying, the tasks have to include multiple activities, with many forms: Working alone, in pairs, in groups or the whole class; both in class and in extra curriculum ...

**2.2.5. Illustrative example of integrated theme assignment**

For Secondary school grade 9 curriculum, we have built the theme “Wise customers”. The theme is based on the knowledge contents of the main subject Chemistry and the related subjects Biology and Home Economics:

- Characteristics of protein, fat, glucids (glucose, sucrose, starch and và Cellulose) (Chemistry 9).
- The role of protein, fat, sugar, starch to human body (Biology 8).
- Food hygiene and safety, methods to preserve and cook the food (technology 6).

We made a list of content units of the middle school textbook included in the theme:

Table 1.

Subject	Grade	Chapter	UNITS
Chemistry	9	Chapter 5: Halogenated Hydrocarbon. Polymer	Lesson 47: Fat L50: Glucose L51: Sucrose L52: Starch and Cellulose L53: Protein
Biology	8	Chapter 1: Generalization of Human body	L3: Cells
		Chapter 3: Circulatory System	L14: Leukocyte – Immune system
		Chapter 5: Digestion	L25: Digestion in mouth L27: Digestion in stomach L28: Digestion in small intestine
Technology	6	Chapter 3: Family Cooking	L15: Scientific basis of balance diet. L16: Food hygiene nad safety L17: Preserving nutrients in cooking. L18: Methods of cooking

- a) The objective of integrated theme is: To develop general abilities and subject abilities so students could apply knowledge into solving problems.
- b) Given the objective, we identified the specific abilities:
- General abilities: problem-solving and creative

- abilities; ability to communicate and cooperate, ability to be independent and capable of self-studying.
- Subject abilities: ability to study nature and society, technology ability, mathematic ability.
  - c) Building content assignments and study tasks.

Table 2.

Assignments	Tasks
<b>Assignment 1</b> - Study a nutritious diet using the nutrient info written on products' labels.	<b>T1:</b> Identify the weight of a meal with the products?
	<b>T2:</b> Find the calories contained in 100g of the products? Is it sufficient of an adult ?
	<b>T3:</b> Find the nutrient contents of the products (what nutrient, how much)?
	<b>T4:</b> What is the note for this product? Explain the note.
	<b>T5:</b> Study the nutrient diet for human body (The amount of calories, the average amount of nutrients (protein, fat, hydrocarbon, vitamin, etc) that an adult human body need for a day, on average. Then identify the given amount of products could serve how many people in 1 meal, or how many times in a day can a person have a meal with that product.
<b>Ass 2</b> – Study the options to preserve the food, to safely consume the food and to guarantee sufficient nutrient	<b>T1:</b> Analyze the amount of fat in snacks written in the labels, then give warnings.
	<b>T2:</b> Identify if these products are appropriate for people with diabetes?
	<b>T3:</b> Observe the numbers written on the bottom of the bottles and boxes, and give precautions for safe usage of the bottle.
<b>Ass 3</b> – Study the different countries' product barcodes	<b>T1:</b> Observe and Analyze the barcodes from different countries.
	<b>T2:</b> Read the barcode number of some products. Identify the origin of a number of products in the supermarket

- d) Target knowledge, skills and attitudes
- \* Knowledge
    - Learn some general information about the origin, components and structures, and the different names of protein, fat, starch and sugar.
    - Apply some related characteristics to explain the process of digestion.
    - Learn the fundamental nutrients needed for daily operation of human body and the role of each nutrient.
    - Identify the safe procedure for preservation, selection and cooking of the food
  - \* Skills
    - Skills of reading and processing nutrient info while shopping.
    - Skills of working in team, discussing in team and presentation.
    - Skill of searching the Internet for info.
  - \* Attitude
    - Spread the word, inform family and friends of food hygiene and safety and balanced diet for sufficient nutrient; preventing disease and selecting products wisely.
    - Love toward the subjects, taking the initiative in studying the knowledge, discussing and cooperating in the process.

### 3. Conclusion

The content assignments in each theme are built in a multi-level structure: (1) The top- objectives of the integrated theme, which is to develop some ability for learners via doing assignments of a certain themes; (2) The basis level – the content assignments closely related to each other help develop the learners' general and subject ability through doing the assignments; (3) Activity floor – consists of study tasks for developing specific study skills.

Integrated theme assignment is considered a form of practice assignment, applying and studying the themes related to the subjects (with a main/central subject) or

fields to appeal to the students, to encourage them to study and apply knowledge into solving realistic problems and to help them have more thorough understanding and be more responsible to themselves, their family, the society and the living environment. These assignments are built with a view to help students reinforce the knowledge and skills learnt in the curriculum in a combinational fashion. The knowledge and experience that the students gain the the whole study process and the study of the subjects in particular are the initial basis for themselves to study the life around them. By doing the integrated theme assignment, the students' general and subject ability will be developed; and the students could apply the knowledge to solve the real-life problems themselves.

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