BỘ GIÁO DỤC VÀ ĐÀO TẠO
TRƯỜNG ĐẠI HỌC THÁI NGUYÊN

PROCEEDINGS OF INTERNATIONAL CONFERENCE ON

TEACHERS' AND EDUCATIONAL ADMINISTRATORS' COMPETENCE IN THE CONTEXT OF GLOBALISATION

NHÀ XUẤT BẢN ĐẠI HỌC QUỐC GIA HÀ NỘI

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Editing at the Department of Science, Technology and International Cooperation,
Thai Nguyen University of Education
No. 20, Luong Ngoc Quyen Street, Thai Nguyen City
Email: phongqlkh-qhqt@dhsptn.edu.vn tel: +84 (0)208 3859431

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FOSTERING INTEGRATED NATURAL SCIENCE TEACHING CAPACITY FOR SECONDARY SCHOOL TEACHERS

Le Cong Triem, Tran Thi Ngoc Anh*
University of Education, Hue University
*Email: Dr.lecongtriem@gmail.com

Abstract: Integration has become a trend in the development of general education in many countries around the world. The integrated perspective is built on the positive notions of the teaching process. Integrated teaching helps to develop the capacity to solve complex problems, and make learning becomes more meaningful for the students than individual courses. However, the deployment of integrated teaching in the current –period of our country's education still faces many difficulties. In particular, integrated teaching capacity of teachers is seen as the underlying cause. Based on the analysis of teaching integrated natural science, the article will propose some measures to foster integrated natural science teaching capacity for secondary school teachers meeting the requirements of innovative general education in the current period.

Keywords: *Integrated, capacity, teaching, integrated natural science*.

1. Introduction

The general curriculum of general education was promulgated on July 27th, 2017. Compared with the current program, the new one has many major changes, especially the inclusion of compulsory integrated subjects. Natural Science at the junior high school substitute for the individual subjects: Physics, Chemistry, Biology in the-former program. This is in line with the trend of education development over the world.

However, the majority of high school teachers today are the previous education generation, single-education period; therefore, they are having a wide range of difficulties in the practice of teaching The most difficult is the lack of integrated teaching ability in general and of integrated natural science teaching in particular.

2. The concept of integrated teaching

The concept of integration is used in several fields. In education, the concept of integration emerges from the eighteenth century, which refers to a view of comprehensive human education, against the phenomenon of unbalanced, inharmonious human development [3], [6].

Integration is a natural and systematic combination of knowledge from different subjects into a unique content, based on the theoretical and practical relationships that are addressed in these subjects[4].

From the viewpoint of teaching theory, integrated teaching offers situations when knowledge linking is required, which is the opportunity for students to develop their skills. When developing knowledge-based situations, students will develop their self-reliance and creativity. Science education through integrated teaching will reduce the redundant of curricular content as well as the stress putting on students, as well as improve the effectiveness to fulfill the legitimate social demands of adding up more new knowledge into school over time [5].

In the world, the development of integrated program or themes has been developed in many subjects and fields of study. In Vietnam, the general education curriculum [2] shows a high integration level in the primary and secondary school, which starts to diverse in high school. For example, natural science in secondary school, with 140 periods/ year is replaced by singular subjects such as: Physics, Chemistry, Biology in high school.

That requires each teacher to constantly accumulate and self-nurture to develop their own professional capacity. It is recognized that integrated teaching capability is one of the most important requirement at the moment. The integrated teaching capabilities cover the three areas below [1]:

General perception of integrated teaching: the ability to discover, analyze, and present how the integration method can be applied to teaching natural science subjects;

Design, plan and take action: the ability to design an action plan based on the matrix of conditions required for integrated teaching, which reflects well integrated content. Having that said, teachers then select appropriate methods and forms to develop and implement a teaching plan that is well integrated with a particular topic or lesson;

Examination and assessment: the ability to evaluate, design and use in a variety of testing and tools (such as: tests, quiz questions, observation tables, ...) Use a combination of assessment methods to assess student competency.

Although integrated education has become popular in high schools in the recent years, there is still a considerable number of teachers who have not had opportunities to approach and practice it, so the idea of integrated teaching is still new to most of them.

There has been a discussion with 49 key physic teachers at Kon Tum Secondary School, and it shows that they are facing not just difficulty in selecting appropriate content for integrated teaching, but also the way to organize a proper integrated teaching process. In the end, it all comes down to these teachers being trained to teach just individual subjects.

Therefore, along with reforming the education program in Pedagogical University to adapt with integrated education challenges, there is also a strong need for a re-training program to make sure that current teacher staff meets the required skills and capabilities.

In addition, the re-training process can not be conducted only once and at the same time for all teachers. Every high school has a team of key teachers. Key teachers play an important role in determining the educational demands and quality improvement at their school. They are in an advantage and objective position, because of working not only with co-workers, with students, but also with parents, with education community, agencies and organizations. Core teams are expectation of principal and management in breakthroughs and bringing a friendly, humane environment for students' advancement and professional development.

Developing a team of key teachers is definitely essential, as this team will be an important driving force as well as help developing other teachers in the staff by spreading the knowledge. Therefore, the highest priority at the moment is focusing on training the key staffs.

Natural science is a field study of the natural world, studying the natural laws of motion and the development of the nature. This is a branch of science that aims to understand, describe, explain, and predict the phenomena and laws of nature, based on well-established evidences. In the natural sciences, widely accepted assumption is commonly used to build scientific theories.

The typicality of nature science is to develop the learner's nature exploration abilities, including: understanding of science; seeking and exploring the natural world; applying knowledge into practical, dealing with nature in accordance with the requirements of sustainable development and environmental protection [2]. Consequently, the foster methods of integrating natural science teachingalso have their own characteristics.

3. Fostering integrated teaching capacity

There are two key focus areas to improve the capabilities of key teachers: (i) forming anintegration oriented teaching method and integration oriented teaching model (ii) implementing a result oriented model by continuously assessing and monitoring student learning outcomes.

3.1. Integration oriented teaching method and integration oriented teaching model

The reform of teaching methods requires certain conditions regarding educational equipment and facilities. Some integration oriented methods can be outlined as:

Improving the traditional teaching methods: The traditional teaching methods such as lectures, conversations, exercise are essential. Reform does not necessarily mean to

replace these, but rather to improve them by enhancing their efficiency and avoid their limitation. Teachers should first understand the requirements and be proficient in the use of the techniques in preparing and conducting classes, which can further help students gain proactivity and creativity;

Combining different teaching methods: There is no such one size fits all when it comes to teaching method. Each method of teaching has its own pros and cons. Hence, combining different methods is important to archive the best demanding result. As such, depending on a specific , a teacher should flexibly decide whether to form students in a whole class, small groups or individuals;

Applying the methods of active teaching: Applying suitable teaching methods actively to offer students opportunity to practice their problem solving skill by combining knowledge and skills from various fields to solve real world problems. Some active teaching methods to name include solving problems; reacting to real situations, learning by projects,etc.Especially for subjects in the field of Natural Science, teaching should follow the approach used in many countries today, which is: "Teaching and learning through discovery and scientific exploration." Applying learning through discovery method means students are offered opportunities to learn by asking and answering questions, designing survey, evaluating answer and presenting their topics ... Students can also learn by studying how scientists conducted researches and how they achieved result in real life. Just enough is more, by providing efficient guide and providing students opportunities to actively discover things by themself, teachers can make learning subjects more interesting to students, which in turn makes the learning process more effortlessly. However, we need to be cautious that the exploration method is not always applicable, it can only deliver best result when combined with experimental and practical topics. The discovery method only works if students discover something worthwhile to them, and the discover is by themself;

Leverage information technology to better support learning: Teaching facilities have always played an important role in the innovation of education, especially when it comes to natural sciences. Beside keeping making good use of traditional practical experiments and self-made teaching facilities, information technology should also be widely applied as it makes subject more intuitive and help diversify the forms of learning;

Along with applying integrated teaching methods, applying new forms of teaching is also importance, namely:

*Conducting more learning sessions outside of school such as:*learning in museums, factories, ... to help students gain practical knowledge;

Forming science clubs: joining the club might bring joys to students by letting them solve interesting problems together;

Promoting experiential education activities: These activities not only help students practice their general knowledge to response real life behavioral problems, but also offer opportunities for families, local communities and schools to build stronger relationships.

3.2. Integration oriented assessing the learning outcomes of students

One of the purposes of assessing the learning outcomes of students is to help them identify the strengths, improve their weaknesses, recognize the progress they have made, as well as learn about their own capabilities. Assessments should always be done for the purpose of finding areas and opportunities for improvement, not for criticizing.

Assessment is used to measure the gain of knowledge, skills and attitudes, and the capacity of the students. At the same time complement the teaching process, providing feedback as a formulation for teachers, students, schools and parents to review and improve.

Assessment of student learning outcomes as the result of integrated teaching is not outside the scope of renewing purposes, subject and assessment methods.

Some assessment factors which directly influence integrated teaching:

Purpose of assessment: not solely assess knowledge, skills but also focus on the general capability. Need to determine the metrics and develop the assessment tool (subject tests, checklists, assessment sheets, etc.) to ensure the assessment covers knowledge, skills, attitude and ability of students, and that the assessment is objective and fair;

Content of assessment: The assessment must demonstrate the integration characteristic, that is: the content of the test associates well with real matters which is close to and meaningful for students. In order to solve the problem posed, students must use particular knowledge, skills, and understand the characteristics of natural sciences;

Form of tests and evaluations: teachers might use different forms, such as writing, Q&A, through observation, reviews, tests, discussions, interviews, and projects, etc.;

Assessment method: Evaluation of a class based on the discovery may have many different forms. Teachers might flexibly apply different evaluation methods depending on the type of assessment, evaluation purposes and circumstances.

Based on the oriented methods, organizational forms of teaching, as well as students' learning outcomes driven, teachers can effectively leverage natural science integrated teaching through these steps:

- Determine the lesson for integration;
- Estimated time required for the integration lesson;
- Define the objectives of the integrated lesson;
- Build up the main structure for the lesson;

- Pick an appropriate teaching method;
- Conduct the integration lesson;
- Assess the result.

4. Conclusion

The above are some oriented methods to foster the capability of secondary school teachers with regards to teaching integrated natural science subjects. The quality of teacher staff is the key factor to the success of the educational reform effort. Therefore, there is a strong need to continuously train and upskill our staff. This is the only way to keep the staff up to date with the new advanced educational methodologies and to apply them effectively, which further contribute to improving the professional capacity of the whole staff.

References

1. Đặng Thị Thuận An (2016), Phát triển năng lực dạy học tích hợp cho sinh viên sư phạm hoá học thông qua học phần phương pháp dạy học hóa học phổ thông, Luận án tiến sĩ giáo dục học.
2. Bộ Giáo dục và Đào tạo (2017), Chương trình giáo dục phổ thông - Chương trình tổng thể.
3. Nguyễn Anh Dũng (2013), Phương án thực hiện quan điểm tích hợp trong phát triển chương trình giáo dục phổ thông Việt Nam giai đoạn sau năm 2015, Báo cáo tổng kết đề tài Khoa học cấp Bộ.
4. Trần Bá Hoành (2013), Dạy học tích hợp, Viện Khoa học Giáo dục Việt Nam.
5. Nguyễn Văn Khải (2008), Vận dụng tư tưởng sư phạm tích hợp vào dạy học Vật lí ở trường THPT để nâng cao chất lượng Giáo dục học sinh, Báo báo tổng kết đề tài Khoa học cấp Bộ.
6. Lolita Jonane (2008), "The Didactical Aspects of Integrated Natural Science Content Model for Secondary School Education", Journal of Teacher Education for Sustainability, vol. 9, 2008, pp. 45-57.