Application of Project Based Learning for Teaching the Grade 11 Biology Subject: A Study on the Current Situation at Thu Duc High School in Ho Chi Minh City, Vietnam

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Abstract: Project-Based Learning is an effective teaching method whose leaners have a complex mission of creating products to give presentation through the combination of theory and practice. The purpose of this study is to generally present the Project-Based Learning, the findings of the research on grade 11 biology teaching based on this method, and the challenges of both students and teachers at Thu Duc high school in Ho Chi Minh City as well.Through the observation result, this research papers proposes methods for organizing Project-Based Learning activities in biology education for grade 11 in order to support students to promote their positive, initiatives in learning, develop skills and efficiently contribute into increasing biology teaching efficiency.

Keywords: Project-Based Learning, Thu Duc high school, Grade 11 Biology Subject, teaching method

1.0 INTRODUCTION

Vietnam country always considers education and training as the top national policy, the foundation and the stimulation for economic growth and society development in the context of international integration. The evolution of the country in this period will not only generate opportunities but also new challenges for the education mission. Besides, the labor market in Vietnam has sharply developed and highly demanded the labor force on expertise, creative capabilities, problem- solving techniques, teamwork skills, responsible attitude… in order to tackle with complicate issues emerging from sudden changes while working. From these aforementioned requirements, Vietnam's education system in general and biology teaching in particular need to create appropriate changes to response to the rising need of economic- society growth.In order to meet the needs of the society on high standard human resources in the era of globalization and knowledge socialization, the grade 11 biology, which belongs to the group of experimental science, should have a multitude of practical applications, orientates its leaners towards careers appropriate to their own capabilities. Besides, Thu Duc high school has a remarkable history with lots of crucial contributions to in the city's education. The school has 53 class rooms, 5 laboratories, 10 subject rooms, 1 STEM room. All of these rooms are well equipped with learning devices to facilitate the teaching and learning process of both teachers and students.

However, nowadays, the importance of this subject is still underestimated. Some of teachers at Thu Duc high school still use traditional teaching methods and the students haven't got too muchhand-on experiences. The teachers utilize other teaching methods such as making conversation, team-working, and problem-solving but not too much often. Therefore, grade 11 biology hasn't ultimately been promoted its function and meaning to the students. They spend less time and effort on this subject as well as their study results don't match with role and position of this subject.

2.0 LITERATURE REVIEW

There has been a great deal of explanationfor the origin of Project-Based Learning. According to M.Knoll "project" was first used in The Art Institute of Italy Accademia di San Luca in the end of the 19th century (Michel Knoll, 1997).At the turn of the 20th century, Project-Based Learning was expanded to many countries, especially the USA through vigorous education reform movements. In the movements of student-centered learning, Project-Based Learning was officially put into practice in high school teaching so as to fix the weaknesses of traditional teaching methods. John Dewey (1859-1952) played an essential role in establish theoretical foundation for Project-Based Learning. In his opinion, a class should be a student-centered environment. With the teacher's instruction, students can upgrade logical thinking through actions, acknowledgements, argumentations and problem-solving practice-the practicality is emphasized more than the theory. In 1918, William Heard Kilpatrick became well-known when he

introduced "Project- Based Learning" and popularized it all over the world. He stated that "child's psychology" is a pivotal factor in the learning process. However, his perception and John Dewey's have many differences. John Dewey emphasized the teacher's role and assumed that the children couldn't set up plan by themselves. Whereas, Kilpatrick didn't place a high value on teacher's function, he claimed that children should have freedom to choose what they like to achieve their own target **(**Michael Knoll, 1997). In a nutshell, John Dewey and Likpatrick are leading educators establishing theoretical basis for the Project-Based Learning method nowadays. After a long period time of being forgotten due to the outbreak of World War 2, since the beginning of 1970, with education reform movement taken place extensively at European nations, Project-Based Learningwas noticed, studied, and applied in numerous countries.

Nowadays, Project-Based Learning is being utilized broadly. In high school education, in the 1960s and the 1980s, with the rapid development of career orientation, plenty of school implemented small projects such as tree planting project, taking care of school campus project, start-up project, etc. In recent years, with outstanding advantages, this teaching method has attracted the attention of several pedagogical researchers like Tong Xuan Tam (Tong Xuan Tam, n.d), Nguyen The Hung and Lai Phuong Lan (Nguyen The Hung and Lai Phuong Lien, 2014), Pham Quang Tiep (Pham Quang Tiep, 2017), Nguyen Van Cuong (Bernd Meier and Nguyen Van Cuong, 2014), etc. Particularly, Mr. Nguyen Van Cuong possesses many researches on the system of Project-Based Learning's concepts, main features, categorization, and learning process.According to the pedagogical researchers, Project-Based Learningis a teaching method where learners execute a complicated learning activity, combining between theory and practice to create the final product for giving presentation. This activity request the initiativesduring the whole learning process from identifying the target, setting up plan to executing the project, auditing, modifying, assessment the result. Teamwork is a basic form of is Project-Based Learning (Pham Hong Bac, 2013, p 20**)**. This method is organized based on an issue in correlation with the subject. Project-Based Learning can bring practical problems into the class room, not just separate issues but a system of activities linked to different learning aspects. As a result, the learners of Project-Based Learning can overcome the barrier among disparate subjects, create the inner stimulus. The leaners play the role of experts in all sectors related to the issues need to be done. The teachers participate into the teaching- learning activities as the instructors. Implementing the project is the learner's mission, which to combine between theory and practice to create the product complied with the teacher's request, reach the subject's goal. Biology is the branch of natural science. Biology establishes and nourishes biological abilities for the students; in the meantime, it contributes into forming and developing primary dignities and common competences (Ministry of Education and Training, 2018, p3). More specifically, in grade 11, biology is the science focuses on the mechanism, biological processes in plant and animal such as: substance and energy metabolism, induction, growth and reproduction. On the other hand, grade 11 biology is the science having many practical applications. It also helps to orientate the learners to select suitable career, meet the society's requirements about high-standard labor force in the context of globalization and knowledge socialization.

Therefore, Project-Based Learning is an appropriate teaching method for high school biology curriculum. It can enhance the initiative, positive quality of the students. Organizing Project-Based Learning at high school is the process including organized manipulations, which request the learners to execute a complex learning mission, combining both the theory and the practice. The students have chances to promote biological capabilities as well as perceive knowledge and hands-on experience through experimental activities, practice problem-solving and create a particular product in order to explore the nature, develop techniques, apply the knowledge into the reality, and select the appropriate the career to pursuit after finishing high school education. Besides, this mission also nourishes the autonomous learning, students must identify their study goals, set up plan, implement the projects, check, modify, assessment the process and result. Team working is the basic ways of working of Project-Based Learning.
The outstanding feature of Project-Based Learning is the learning process. According to the aforementioned researchers, the learning process is divided into these stages (Bernd Meier- Nguyen Van Cuong, 2014; Frank Bünning, n.d.):

+ Making proposals for the learning project: It is an important stage to orientate the activities of both the teachers and the learners. It has an impact on the whole project implementation process. The teacher analyses the purpose and content of the subject, characteristics of each student and study environment to suggest the possible projects related to the real life and lessons' content. From that, the students think, find ideas, and participate in group discussions to select the topic, identify the project goals.

+ Sketching the learning project: In this stage, the students take the initiative role, all team members must be active in presenting their ideas, discussion, and argumentationto unify the ideas about the project proposed in the framework agreed in advance.

+ Building plan for the learning project: The students will make an action plan with the teacher's instruction. Each member in the group will be assigned with appropriate tasks that fit their competences in a particular situation. They must try their best to accomplish assigned responsibilities. The teachers need to give the deadline for each project so that groups can control the project schedule. At the same time, the teachers also need to open discussions to keep track on the learners' progress to make adjustment in time.

+ Implementing thelearning project: The students continue conducting the assigned tasks: research through reading document, carry out experiment, discuss with other members in the same group…Above all, the students know how to coordinate the theory and the practice to create new information with the teacher's guidance. All groups must assure that the product can be generated before the given deadline. In The other hand, the teachers take the responsibilities of the monitor, observer who always check the students' progress during the project. The teachers usually give advice as well as suggest methods and devices for their learners while studying. The teachers need to encourage, pay compliment to the group complete the project on time.

+ Presenting, reporting and assessing learning project: The students must complete the project for presenting. The product can be tangible or intangible asset, which is presented among the other student groups either in the same school or in the society in the form of assessment test, report, model, etc. After the project holder presents their product, the teacher and the other students will give comments on it and the implementation process through available criteria and take experience for next projects.

However, in the reality, the stages in a learning project cannot be distinguished apparently. During the whole process, the students take the initiative role while the teachers play the auxiliary role, providing necessary knowledge.

3.0 RESEARCH METHODS

The purpose of this research is to evaluate the reality of Biology teaching in general and Biology Teaching from the angle of Project-Based Learning for grade 11 to establish the basis for the utilization of this teaching method in Biology Education at high school.

The research method of using questionnaire and observation was used by the researcher to carry out the observation with 4 teachers teaching Biology for 317 students in grade 11 at Thu Duc high school, HCM city.

4.0 RESEARCH RESULT AND DISCUSSION

4.1 The real state of Project-Based Learning Biology subject in grade 11 Biology teaching at Thu Duc high school

4.1.1 The understanding level of Thu Duc high school's student about Project-Based Learning method

Table 1: The understanding level of students about Project-Based Learning at Thu Duc high school

No	Students' awareness	Level					
		Agree		Confused		Disagree	
		Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
1	Aware and learnt	88	27.8%	163	51.4%	66	20.8%
2	Aware but not learnt yet	67	21.1%	162	51.1%	88	27.8%
3	Unaware and not learnt yet	86	27.2%	113	35.6%	118	37.2%

As can be seen from the table's result and the observation process, the majority of students (more than 50%) were introduced and accustomed to Project-Based Learning, but they didn't comprehend the nature and features of this teaching method. Hence, they were still confused about the problem which they participated in while studying at school.

4.1.2 The opinion of students at Thu Duc high school about the use of Project-Based Learning in Biology teaching (Table 2)

Table 2: Students' opinion about the Project-Based Learning utilization in teaching grade 11 Biology

No	Student's awareness	Level					
		Agree		Confused		Disagree	
		Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
1	Continue using Project-Based Learning in teaching appropriately	225	71%	84	26.5%	8	2.5%
2	Unnecessary	22	6.9%	110	34.7%	185	58.4%

It can be concluded from the table's figures and the researcher's observation that, most of the students (71%) who participated in the survey agree that the utilization of the Project-Based Learning method should be continued in teaching Biology. It proves that the students take interest in and pay attention to this teaching method, which contributes into enhance the positive in learning, facilitate to the application of the project- based learning method in teaching Biology in grade 11.

4.2 The reality of the project-based teaching Biology subject for grade 11 at Thu Duc high school

4.2.1 Sources of information about "Project-Based Learning" teaching method of grade 11 Biology teachers at Thu Duc high school (table 3)

Table 3: Sources of materials about "Project-Based Learning" for the teachers teaching Biology grade 11, Thu Duc high school

No	Teachers' awareness	Level					
		Agree		Confused		Disagree	
		Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
1	Technique Training	3	75.0%	1	25.0%	0	0.0%
2	Materials guiding how to implement Project-Based Learning activities	3	75.0%	1	25.0%	0	0.0%
3	Internet, books, newspaper, references	4	100.0%	0	0.0%	0	0.0%
4	Colleagues	3	75.0%	1	25.0%	0	0.0%

From the result provided by the table, it can be interpreted that all sources of reference for Project-Based Learning are reliable. With the consultation of the Ministry of Education and Training as well as experts through training workshops, reading materials, the teacher can enhance knowledge and techniques through book, newspaper, or

from their colleagues. It helps them understand more about the roles, strong points of Project-Based Learning in comparison with other teaching methods.

4.2.2 The opinion of Biology teachers for grade 11 at Thu Duc high school about Project-Based Learning (Table 4)

Table 4: Opinion of Biology teachers for grade 11 at Thu Duc high school about Project-Based Learning

No	Content	Level					
		Agree		Confused		Disagree	
		Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
1	Pay a lot attention to Project-Based Learning	4	100.0%	0	0.0%	0	0.0%
2	Project-Based Learning is suitable for the high school education	3	75.0%	1	25.0%	0	0.0%
3	Project-Based Learning is suitable for Biology teaching grade 11	3	75.0%	1	25.0%	0	0.0%

It can be shown from the above table that, all of teachers who teach Biology for grade 11 at Thu Duc high school pay much attention to this teaching method and agree that it is suitable for teaching Biology grade 11. This is the foundation for promoting the positive of the teachers when applying the Project-Based Learning in teaching.

DISCUSSION

Most students acknowledge and get accustomed to the Project-Based Learning method, but they don't understand apparently it. However, when being interviewed, they all hope that this teaching method should be continued to be applied for teaching new knowledge appropriately. It facilitates the utilization of Project-Based Learning method in grade 11 biology teaching in the future. Besides, all teachers who areintroduced, trained carefully Project-Based learning, agree that this teaching method is suitable for Biology knowledge.

Project-Based Learning has not been broadly deployed in Biology teaching for grade 11 at Thu Duc High School. However, if teachers know how to use it appropriately, systematically and scientifically, they fruitfully increase the teaching quality and efficiently improve the study skills, Biological techniques for the students. The combination of the advantages of the purpose and lesson contents, modern facilities, students' capabilities, teachers' techniques is the foundation for the development of Project-Based Learning in the era of globalization and knowledge socialization.

5.0 CONCLUSION

In order to conduct the research on Project-Based Learning for grade 11 Biology teaching at Thu Duc high school, Ho Chi Minh City, the researcher introduced in general about the teaching method. Besides, the researcher utilized the research methods (questionnaires and observation) to conduct observation with 4 teachers and 317 students in grade 11 at Thu Duc high school.

The observation of the Project-Based Learningapplied in Biology teaching for grade 11 at Thu Duc high school, Ho Chi Minh City presents the advantages of main targets, subject content, modern facilities, and study capabilities of the students and the teaching skills of the teachers. In the other hands, it also mentions the emerging challenges in organizing the Project-Based Learning activities. The listed figures are the practical basis to propose effective solutions in order to set up fruitfully Project-Based Learning for grade 11 biology teaching in other to enhance

teaching quality and help the students take the initiatives in accumulate the knowledge, practice study and career skills.

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