Project-Based Learning from Constructivism
Point of View

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Constructivism is a learning theory that perceives learning as a process of constructing knowledge based from experience. Issues of difficulty in translating this learning theory into a teaching and learning practice have become a debate among educational researchers. One of the learning approaches that reflect the theory of constructivism is project-based learning or PjBL. Terms such as “authentic learning activity” and “hands-on learning” is commonly represented as constructivist which believes and addressed learning through rigorous, relevant and hands-on practice. This study will explore the notion of constructivism as a learning theory in connection with PjBL and investigate the integration of constructivism in PjBL setting. The implications of constructivism in the PjBL setting will also be discussed.

Keywords: Constructivism, Project-based learning, learning theory, learning approach, authentic learning

1. INTRODUCTION

Constructivist believes that learning is a journey of discovering meaningful information. Constructivism can be defined as a theory of learning in which individuals create their own new understanding on the basis of interaction between what they have already know and what they come into contact1. Constructivist believes that constructivism able to eliminate struggles of learners with the assistance of teacher and knowledgeable others. One of the main challenges arise from constructivist learning is the difficulty in translating this theory into a practice of teaching and learning. Teachers should understand and should be trained on how to implement this learning theory in their classroom. One of the learning approaches that reflect the theory of constructivism is project – based learning or PjBL.

PjBL emerge as early as in 1900s where John Dewey and his advocacy of “learning by doing” have reflected the theory of constructivism. Dewey2 explained that learning is an active constructive process rather than passive absorption and it requires practice from a task. Project-based learning acquires tasks to be hands-on complemented by students in real-world situations, which are authentic. Yam and Rossini3 described project based learning as an approach that involves finding answers to real world problem through investigations that were done collaboratively.

It requires the students to solve problems in which the tasks or learning activities should be authentic or realistic. In turn, authenticity can be adapted from learning by doing. It is essential in helping students at a metacognitive level such as asking them further question and elaborates answers given. This paper will discuss further on the notion of constructivism as a learning theory in connection with PjBL. Furthermore, the implications of constructivism in the PjBL setting will be elaborated further in the next subsection.

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2. THEORY OF CONSTRUCTIVISM

The notion of constructivism was pioneered by 20th century American psychologist, John Dewey. In particular, Dewey pointed out that education depends on action: the experience given to learners is important as it draws meaning to them. His ideas became influential to other researchers as the latter believed that the expanded ideas that evolved around Theory of Constructivism explain how learners construct their own understanding. A project-based learning requires students to be involved in authentic activities in which they can experience learning by doing.

In this sense, students are no longer conceived as a passive recipient of knowledge. Another prominent constructivist is Jean Piaget. Piaget stated that we make meaning based from experiences we encounter in life. He added that, the foundation of constructivist approach in education lies in which students build knowledge by asking questions, investigating, interacting with others and reflecting on the experiences.

Jones and Arage portray constructivism’s perspectives on the role of the individual. They had also highlights on the importance of meaning-making and on the active role of the learner as they believed it is the element that makes the theory appealing to educators. Educators typically aware of student’s prior knowledge, and recognize that they are not coming with empty vessels just waiting to be filled with knowledge. In turn, students have a lot of prior experiences, knowledge and beliefs that they can use in constructing new knowledge and understandings.

3. PROJECT-BASED LEARNING

When project-based learning approach implemented in the classroom, students gain the opportunities to engage in a real-world problem. For example, rather than learning to produce graphic images using computer software from a tutorial book, student acts as a consultant to create a commercial company logo for commercialization. Project-based learning constructs driven paradigm to students in which the problem could “drive” them to the core concept of particular subject. The project should occupy student’s constructive investigations whereas this includes inquisition, decision-making and resolution from the students. However, certain degree of difficulty of project-based teaching, whereas certain activities such as simple instructions and practice that involve “already -learn information” are fail to fulfill the criterion of project-based learning. Project-based learning engages student’s autonomy in learning. For example, they themselves are responsible towards their choices, decision and even solutions for the problem they faced. Realism refers to the nature of the project whereas it should be realistic and the problems of the topics covered should be authentic to the students.

According to Kwok and Tan project works consist of complex cognitive and also metacognitive process, which means it requires both “hands-on” and “minds-on” learning. They added that the complex cognitive process is actually required in project work and it is a medium for higher order learning as Moursund describe project-based learning as an action-oriented activities and it focus on doing something instead of learning on something. The activity is carried out through certain period of time whereas it will produce a product and students’ performance can be measured at the end of the session. Integrating project based learning with computer-simulation modeling is effective when there is thoughtful planning and implementation. Instructors, teachers or content experts should identify how students can gain knowledge from resources that is infused with technology.

Moreover, Tseng et al. studied student’s attitude towards engaging project-based activity in learning science, technology, engineering and mathematics in one of the university in Taiwan. They discovered that project-based learning environment could generate positive attitudes among students such as enhance effectiveness and meaningful learning and thus, persuade student’s attitude for future careers.

4. CONSTRUCTIVISM IN PjBL SETTING

Constructivism suggests how learners can construct knowledge based on the experience they have encountered in life. It is based on an action and hands-on learning experience while dealing with real-world problem. Therefore, project-based learning (PjBL) is very much related with this conception. PjBL tends to have more flexible learning as it gives way for learners to demonstrate what they know. It gives them few alternatives and solutions in dealing with problems they faced. Thus, PjBL promotes active learning and student-centered learning environment.

In designing and delivering PjBL environment, instructors play a crucial role. Instructors should plan appropriate instructional strategies that incorporated with the criteria of PjBL. Based on Dewey’s theory of constructivism, Larmer suggested that a project can be authentic in four ways, some of which may be combined in one project:

i. The project meets real world situations beyond the classroom setting, or the products that students create can be used by real people. For example, students develop a project of multimedia application using software that can be used by others. They produce products which they develop and design by themselves.

ii. The project focuses on a problem, issue or topic that
is relevant to learning content. For example, instructors provide a project or task that requires students to complete particular tasks. The main aspect is that it must be related to the learning content in class.

iii. The project sets up a scenario or simulation that is realistic.

iv. The project involves tools, tasks or processes in real settings. For instance, students explore the issues of how to design a web-based system that could apply users’ interactivity using an appropriate programming language.

Recently, PjBL has increasingly been supported with computer technologies7,13,14 and indirectly fostering students problem solving skills in a real world setting. Integrating technology into learning has influence students to construct knowledge they learn with the assistance of technology as educational tools and what is more important is that, it made central to students’ learning process. The use of social media like Blogs and Facebook can be a platform for the active and interactive discussion between instructors and students.

Besides the use of technology as a learning tool, instructors should focus in empowering learning. In PjBL environment, instructor act as a facilitator rather than a subject matter expert. In facilitating the students, continuous discussion between instructor and students play a major role. In PjBL environment, the projects are usually complex in nature and prone to have challenging tasks that require students to solve the problem. Therefore, there is a need of facilitation from the instructor to assist the students in completing complex tasks.

5. IMPLICATIONS OF CONSTRUCTIVISM IN PJBL SETTING

One of the implications of constructivism in PJBL setting is that, while adopting PJBL approach, instructors should be involved in designing and developing the instructional strategies. This include analyzing the student’s need, analyzing the objective of the course, planning the role of instructor and students, planning the teaching material, preparing assessment methods to be used and so on.

If teaching were to be approached from a constructivist point of view and when PJBL is adopted, the instructors is suggested to comply with the guidelines as suggested:

i. The instructor should understand student’s prior knowledge. While exploring new knowledge, students usually bring along their existing knowledge. As an instructor, it is the responsibility to addressed

ii. The instructor facilitates the learning process so that it helps student to obtain new knowledge and solve complex tasks.

iii. The instructor should plan the learning materials and assessment types to be used in teaching and learning.

iv. The tasks or learning activities should allow students to work in a group and work collaboratively with their peers.

v. The tasks or learning activities should be realistic and authentic in nature.

Meanwhile, Moursund7 listed out several possible advantages of project-based learning approach for students. The advantages include, it helps learners to learn in authentic, challenging and multi-disciplinary environment, it allows the students to design, complete and evaluate the task given by the instructors on a period of time, allow the students to learn on the subject matter of the project, allow the students to work on minimal guidance, and finally, it enhance student’s self-confidence and train students to become more independent.

6. CONCLUSION

From constructivist point of view, learners develop knowledge based on the experience and from the experience, they reflect on what they had gone through. They are constructing knowledge based on the cognitive processes. While constructivism is a philosophy of how one learns, it is very crucial to have a delivery instrument that consolidates many of the constructivist practices that have been known to successfully help students create knowledge. PJBL is such an instrument.

Roessingh and Chambers15 provided guiding principles for PJBL instructional design. Among the guideline, they suggest that the learning tasks need to be designed in a way it requires learners to engage in more cognitive demanding tasks. Continuous assessment and monitoring is also challenging in PJBL setting. Assessment for learning and learner’s reflection of learning are also integral to PJBL. In sum, these are the prominent factors that contribute to the successful of translating constructivism into a teaching practice, in this case it is done through PJBL approach.

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