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FEATURE

Fostering Creative Skills for Students Using Project-Based Learning

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Abstract. *Creativity is one of the essential skills that generate new solutions to problems. It responds to the needs of the new generationthrough the process of teaching-learning. While project-based learning (PBL) is among different major approaches that foster students' creativity, it is not incorporated in the school curriculum at all levels. Bender (2012) asserts that PBL is a teaching method that helps learners face and address real-world problems effectively. It is the primary model of instruction recommended in the 21st century. This theoretical paper presents how creativity and PBL have an important place in the school curriculum. It also points out the roles played by instructors and learners to promote creative thinking using PBL, and the challenges they encounter. It finally provides the ways learners participate in this process in order to be more innovative, collaborative, and creative to solve current and future problems.*

Keywords: creativity, project-based learning, curriculum design, 21st-century skills, problem-solving, Philippines.

Introduction

In the 21st century, creativity is essentially needed to provide solutions for current and future multifaceted problems. Lille and Romero (2017) assert that "creativity is a key competence in 21st-century education" (p. 32). Creativity is one of the major skills learners need mostly to build up in the 21st century in order to face the new advances brought by technology and also to prepare their future job (Hanif, Wijaya & Winarno, 2019). The young generations need a strong basic education that allows them to learn and possess creativity. Educational curriculum is to be designed in such a way it fosters creativity in learners (Wong & Siu, 2012).

Creativity is more important now than ever before to respond usefully and effectively to the evolutionary changes. It has advantages not only for individuals but also for the whole society (Runco, 2004). Teachers who deliver instruction creatively provide a great environment that fosters creativity in their students. The opportunities created by the teacher encourage creativity explicitly in the learning process, but the teacher's actions and engagement will implicitly influence students (Cronin & Hiett, 2015). However, the fact that some schools do not care about creativity blocks, impeding the creative mind of students. Many of the instructional models do not consider creativity as the priority of the educational system. Thus, the idea that school destroys creativity has gained popularity in recent years (Cayirdag, 2017).

Project-based learning (PBL) is a basic method that helps learners to face world issues and meaningful problems. It is the model through which students develop collaboration that helps them create solutions to address complex problems in the 21st century (Bender, 20012). PBL is the major approach that enhances creative abilities (Isabecov & Sadyrova, 2018; Wurdinger & Qureshi, 2014). Additionally, Isabekov and Sadyrova (2018) argue that PBL enables to discover and meet the needs of learners through the new ideas, materials, or object created by students as an outcome. Students learn "to explain their thoughts more reasonably and note improvement of thinking activity" (p. 47). Given the significance of including creativity and PBL in a school curriculum, Major and Palmer (2001) suggest that the curriculum should be revised in order to create a classroom in which students are taught and initiated to have creative thinking that helps them discover, understand, analyze and apply the knowledge in new situations on given subjects. Unfortunately, creativity and PBL g are not promoted in some schools (Tobias, Campbell, & Greco (2015). Rshaid (2017) states that "the main reason why creativity is not a premium in most school curriculums all over the world is that the main priority and goals of the formal schooling are related to ensuring that students master certain standardized contents" (p. 123). With such practices, students' creative skills are not really developed and PBL is not promoted.

This paper aims to provide ways through which PBL enhances students' creative skills. It presents evidence of the necessity of creativity at the school level, provides the characteristics and advantages of the use of PBL for students. Further, it makes clear the roles of teachers and learners in the implementation of PBL. Finally, the ways to incorporate creativity and the project-learning in the curriculum with the participation of teachers and learners are also provided in this paper.

Creativity

In the 21st century, creativity is the prior skill which should be privileged and developed. In the present and future world, learners attending school need to be taught skills of high level because the uncertain future they will face requires skills that lead to the transformation of knowledge in new and authentic ways. The school has an important task to address creativity as a significant skill incorporated in the curriculum (Rshaid, 2017). According to Lille and Romero (2017), "the maker-based activity has to be designed in a way that students can have a creative margin in the process and results while also feeling the need to acquire content-related knowledge in order to create their solutions" (p. 43). Teachers have a responsibility to make students creative in the process of teaching.

Creativity Defined

Creativity is considered as the ability to produce new and authentic ideas that are expectantly worthy. It implies having the capacity to think about new possibilities and alternatives, to have the capacity of designing or making something visible mark, be able to foster an open and imaginative state of mind not limited in the old modes of thinking. It is not a talent people are born with; rather, it is a skill that can be learned and developed (Rshaid, 2017). According to Amabile (2012) being creative is to produce a new and appropriate response, production, or solution to a distinct and clear problem. The response must fit a specific purpose. "At the simplest level 'creative' means bringing into being something that was not there before and has been brought into being" (Awang & Ramly, 2008, p. 334). Students are required to use their creative imagination to create practically new solutions to problems evoked.

Jahnke, Haertel, and Wildt (2017) consider that there is not only one meaning of creativity. They emphasize that professors of higher education consider creativity as subjective things and as a personal process. Lille and Romero (2017) state that "despite the multifold aspect of creativity, there are features of creativity that are often mentioned by scholars when it comes to defining it, such originality, novelty, and relevance" (p. 32). Students need to get creative skills at an early age in order to have a problem solved in the future.

Teachers' Creativity

Teachers are the right corner to promote and foster creativity among learners since they spend much time with students. Additionally, they are supposed to know well the capacity, aptitudes, and competencies of learners. According to Awang and Ramly (2008), teachers are encouraged to use methods and techniques for the promotion of creative thinking because learners are expected to be creative and get new productions as results of their creativity. These two authors suggest that students be encouraged and participate in the process of creativity by enabling

them using their imagination, learning styles in order to get the problem solved. Cayirdag (2017) asserts that through the three inter-related parts, which are the teacher as the owner of creativity, educational practices, and the classroom climate, a difference can be made in student's creative potential. This implies that the teacher must be personally creative in order to promote creative activities in the classroom

Creative teaching implies the involvement of teachers in using imaginative strategies during the teaching process to make learning more attractive and successful. Conversely, teaching for creativity consists of instructors to foster students' creativity after identifying their creative strengths (Cayirdag, 2017; Cremin, 2008; Jeffrey & Craft, 2004). According to Ng (2006), creative people have skills of not only finding problems but also identifying the right problem to solve in a specific situation. He states that "The creative teacher who wishes to nurture creativity in the classroom should strengthen the problem-finding skills of students" (p. 169). Teachers are called to be skilled in the matter of creativity. Otherwise, they will have hesitations and will not be able to supervise and evaluate the learners' outcomes.

Curriculum Design and Creativity

Teachers make plans and teach according to the plans made available in the curriculum. Rshaid (2017) states that "developing creative insights has become a necessary skill and as such, it should become a priority when designing school curriculums" (p. 126). Children are born differently and have different aptitudes. Some may be interested in discovering the problem and eager to find solutions, while others want problems solved for them. At this point, Rshaid (2017) argues that though creativity might be difficult for some students, it does not imply that creativity is a prerogative of those few learners who are naturally creative.

The way a school curriculum is designed may hinder the encouragement of creativity skills at the school level. Rshaid (2017) wrote about the limitation of the skill by the way the curriculum is designed in the following way:

> One of the obstacles that limit creativity is the fixed curriculum. In this all learners are called to perform to the same standards, the curriculum is the same for everybody, thus eliminating any possibility of being creative in terms of education activity, projects, not allowing the teachers any leeway in determining how best to approach the learning objectives. (p. 127)

The school curriculum designed at the national level promotes learning and comes up with results expected by designers and teachers according to their goals and objectives. However, this curriculum declines the potentials for learners if it does not include the aspects of creativity to help students think big, both critically and analytically. The core knowledge is got in the satisfaction of adults but not for learners.

Project-Based Learning

PBL is viewed from different perspectives. Blender (2012) argues that PBL is one of the most successful methods that involve learners to focus on the content, and it is recommended by the best strategy in the teaching process. It "may be defined as using authentic, real-world projects, based on highly motivating and engaging questions, task, or problem, to teach students academic content in the context of working cooperatively to solve the problem" (p. 8). PBL encourages social learning. Students practice the theory they learn and become competent and equipped with 21st-century skills. These skills allow them to communicate, negotiate, and collaborate efficiently. Brainstorming makes students work on their projects and listen attentively to each other in the group (Bell, 2010).

PBL finds its core ideas in the problems that motivate students to think big, acquire new knowledge and get problems solved (Ergül & Kargın, 2014). The effectiveness of PBL learning is found in the promotion and development of several skills through integrated and significant activities. Its value is found in the fact that it has a big connection to real-world problems and helps students demonstrate practically what they know. Further, PBL learning involves students in investing and allow them to participate in different interactive activities (Rochmahwati, 2015).

The Goal of Project-Based Learning

The prime objective of PBL is to train learners and equip them with self-direction, independence, and make them become life-long learners. Further, in PBL, students increase their way of thinking and getting the solution to a problem by active participation, reasoning, and meta-cognition (Hung, Jonassen, & Liu, 2008). PBL allows learners to show a high ability (Crowley, 2015), increases the success of students, helps learners get their problems solved, enhances collaboration, improves their knowledge, equips them with different skills and the ways of learning (Coyne, Hollas, & Potter, 2016).

Perceptions of Project-based Learning

As a teaching-learning process method, projects in PBL are driven by students, facilitated by the teacher. It is a mindset and structure through which skills and content are taught. By asking questions, learners develop their knowledge and satisfy their natural desire for knowledge. The basis of the project is an inquiry in which students develop to guide their research under the guidance of the teacher (Bell, 2010; Lenz, Wells, & Kingston, 2015). In many schools of tertiary education around the world, problem-based learning has been considered as the method of delivery. It is also considered as one of the approaches that place learners at the center of education focussing on the help provided to learners for the development of their auto-directed learning skills (Awang & Ramly, 2008).

There is a great relationship between creativity in teaching and problem-based learning. PBL does not only consist of solving a problem but also increases knowledge and understanding (Awang & Ramly, 2008). However, students' creativity demands much attention. The creation of autonomous and inventive thinking skills is not simply acquired by the learning process. It has to be fostered and cultivated (Isabecov & Sadyrova, 2018).

Project-Based Learning in the Classroom

Compared to different traditional practices PBL involves different instructional methods (Bender, 2012). First, teachers should consider how PBL is different from projects accomplished previously. Second, teachers have to take into consideration how PBL fits with their instructional practices and how those practices would be modified as they move into PBL. Last, today's instructional environment requires that all instructional practices be based on research. Thus, teachers are required to have some global knowledge of the research regarding the use of PBL (Bender, 2012). Teacher training in the use of PBL is needed to equip instructors on how this approach works.

Practically, through PBL, students develop understanding by involving a multifaceted problem that has multiple possibilities of answers. A student should be in the situation that let him feel that he owns the problems, and effective solutions are expected from him. The problem is designed to emphasize the complexity of the situation in the area of concentration of the student. In its reflexivity, PBL fosters thinking about the solution and the process through which the solution is found (Huysken, Olivey, McElmurry, Gao & Avis, 2019).

Characteristics of Project-Based Learning

PBL is a major tool which helps teacher, learners, and school grow depending on the results from great thinking and learning. Bender (2012) states some characteristics that differentiate PBL and traditional project assignment in the following way:

> These include, at a minimum, the framing of driving question for the study, student voice and choice inherent in PBL approaches, the collaborative nature of PBL assignments, the longer time frame for PBL projects, the depth of content covered by PBL projects versus traditional project assignments, and the ultimate publication of the results of the students' study efforts. (p. 31)

These characteristics are necessarily important for every form of project-based approach for enabling teachers and learners to help each other for the success of the project taken into consideration.

Anchor and driving question. Teachers are called to be more creative by making every effort to delineate anchors for PBL projects that will help students be

more interested in solving a problem (Blender, 2012). The foundation of the PBL experience consists of a driving question. This question is developed either by the teacher in advance or formulated by student teams. This driving question is supposed to engage both the attention of learners and allow them to focus their efforts on the specific information needed to get the problem solved. PBL may cover several weeks of work and may cover several units of the instruction or program (Blender, 2012).

Student choice and voice. Student choice is critical for eliciting active student participation in and ownership of the project. Teachers should encourage the opportunity for students' choices through the PBL experience (Bender, 2012). The choice made by the students is very significant for them to succeed. It helps them develop their interest in carrying on their knowledge deeply. Their choice fosters their degree of self-confidence deeply, increasing their interest and critical thinking abilities (Bell, 2010; Tamim & Grant, 2013). Students choose a project to develop among a number of theme projects proposed by the teacher (Do Amaral, Gonçalves, & Hess, 2015).

Collaboration and teamwork. Interestingly, collaboration is one of the significant skills most needed in the 21st century. One of the major skills provided by PBL is to know how to work with a group of individuals to solve a problem. Knowing how to deal with others is a crucial workplace skill needed to be employed in the current century (Bender, 2012).

Talking about the importance of collaboration in the method of PBL, Isabekov, and Sadyrova (2018) state that

> through dialog-based learning, students learn to cogitate, address complex problems based on situation analysis and relevant data, compare opinions, take balanced decisions, take part in discussions, and communicate with people. Working in groups and in pairs, micro-research projects, role-playing games, discussions, etc. help a student stimulate and enhance creative activity as his/her own experience becomes a source of learning. (p. 47)

PBL develops autonomy when students are working on the designated project, it develops research skills, and communicative activities of PBL promote independence and creativity (Sirisrimangkorn, 2018). Through PBL, students participate actively in groups and come up with the conclusions through inquiry they lead. Students have accountability based on the ability of each one when presenting their projects (Ergül & Kargın, 2014).

Bell (2010) highlighted that in the future, students will be evaluated based not only on the results but also on the skills to collaborate, negotiate, plan, and organization. He stated that "by implementing PBL, we are preparing our students to meet the twenty-first century with preparedness and a repertoire of skills they can use successfully" (p. 43). Laur and Ackers (2017) believe that young learners use their innate interest to get an understanding of things. That natural curiosity is

fostered in the area of creativity, critical thinking, communication and collaboration.

Opportunities for reflection. This is an important skill in PBL. Reflective thinking prepares the students to be more active in developing their thinking skills and structuring opportunities for reflective thinking. This is the key to the development of students' creativity for problem-solving (Bell, 2010).

All the steps of PBL help students increase logical thinking. Further, their creative capabilities are not only enhanced, but also they are motivated to do their research work. "Project-based learning may be applied as a pedagogical technique implying not only knowledge integration but also the application of up-to-date knowledge and further growth" (Isabekov & Sadyrova, 2018, p. 47). Involved in PBL, learners and teachers can discover new knowledge that can contribute to the world of science and research.

Advantages of Problem-Based Learning

Through PBL students learn how to be accountable and responsible through purpose setting and the expectations of peers. When students collaborate while accomplishing their work, there is an expectation that each one of them will make an equal contribution to their common project (Bell, 2010). Learning to be responsible, independent, and disciplined are three major results of PBL. The way students organize themselves is good enough to allow them to remain focused on the work to accomplish. Furthermore, in order to achieve their goals set at the beginning of the work, students manage the time work wisely and remain focused on their tasks for success and make their own decisions (Bell, 2010). Bender (2012) asserts two major advantages research pointed out for PBL. First, problem-based get learners motivated and interested in fulfilling the required task. Second, the students' success increases with PBL since it encourages the skills needed in the 21st century (Bender, 2012; Tamim & Grant, 2013).

Bell (2010) considers that the opportunity to make mistakes is an advantage and it is part of their learning process. This is because while implementing PBL, students discover who they are as students. Ummah, In'am, and Azmi (2019) support that PBL provides students a higher ability of creativity through different projects of the school. According to Do Amaral et al. (2015), working on the projects in new areas where the students do not have experience yet empowers their knowledge

Teacher Challenges in Project-Based Learning

Teachers face different challenges in implementing PBL. Tamim and Grant (2013) summarize six challenges faced by teachers in PBL. The first consists of the constructivist approach. PBL brings the conflict to the basic philosophies of teachers regarding their power in controlling project activities. Additionally,

teachers tend to use the same traditional approach they have been using in communicating knowledge to learners in the past. Thus, teachers need to understand and accept the ambiguous and flexible environment created by the student-centered approach. Second, it is not easy for teachers to adopt new instructional strategies impeccably. The past experiences of teachers affect the degree of implementing the PBL. Therefore, teachers need guidance on how to implement PBL approach. Third, curriculum and theme choice are problematic: teachers are challenged when they have to balance district curriculums, to test policies and to make sure they have covered all required content of the schedule. Further, the lack of enough expertise for teachers on the subject to teach, coaching the proper investigation or the learners to explore the areas they are not familiar with. Fourth, teachers face challenges of controlling all the aspects of PBL; for example, the ability to manage a huge class, maintaining all the students engaged, learning context. Fifth, assessing PBL is confusing. Teachers must have the ability to evaluate learners' work accomplished. However, some teachers ask learners to produce things that do not require critical thinking. Finally, the nature of collaboration may be a problem for those not willing to cooperate.

PBL involves group work as it is a constructivist instructional model. The most complicated aspect of PBL is the ability of students to work together. This is culture collaboration issues. Students need to learn how to help each other. Ergül and Kargın, 2014 and Kizkapan and Bektas (2017) suggest that in order to promote the PBL potentiality, projects are to be designed based on topics from the daily life of students. This will not only motivate students but also develop their thinking skills of a high level.

Roles of the Teacher in Project-Based Learning

In the teaching based on PBL, the teacher is viewed as a guide and a facilitator of instruction. He has to coach groups of students or work with individual learners in research since the emphasis is on student involvement in problems and projects they find worthwhile (Bell, 2010; Bender, 2012). According to Laur and Ackers (2017), the first role of the teacher is to design an open-ended project that immediately invites learners to participate actively in finding the solution to the problem. As a knower of the teachings, the roles of a teacher are seen in helping students choose topics, generate ideas through brainstorming and mind-mapping, and guide students elaborate their project objectives.

Roles of Students in Project-Based Learning

In the PBL approach, students initiate their learning. During their process of learning, they become the researchers and find solutions to the problems defined at the beginning of the project. They do not receive information passively. Further, they define their respective roles in their learning process and make all the arrangements of learning (Hung, Jonassen, & Liu, 2008). Students are responsible

for their work. They plan how to accomplish their tasks according to the time given by the teacher. Bell (2010) argues that when the project is ended, students do an auto-evaluation. They do not only appreciate their way of learning during the project but also how they interacted socially for success. Reflecting on their communicational skills, they evaluate whether they listened to each other or built the conclusion on one's convincing opinions.

The method of PBL seeks to make students the main architects of their own learning processes. It is one of the different active methodologies that give responsibility to students and the opportunity to take their way of learning. Working in small groups increases the capabilities of every team member through self-learning (Requies, Agirre, Barrio & Graells, 2018).

Project-Based Learning and the School Curriculum

Curriculum content is to be delivered through PBL. Projects are conducted based on driving questions that lead students as researchers and help them practice the theory (Bell, 2010); questions stimulate learning and understanding (Barrow, 1996; Hung, Jonassen, & Liu, 2008). Hung, Jonassen, and Liu (2008) asserted that very recently, medical students were engaged in the process of curriculum design in order to provide their points of view. Based on Chung and Chow (as cited in Hung, Jonassen, & Liu, 2008) "the students' workload and assessment methods designed in the curriculum were improved to better address students' capabilities and promoted learning when student representation was included in the curriculum design process" (p. 496). In medical schools, however, PBL curricula are usually established by a committee made of teachers and people in charge of instructional design.

However, in elementary, secondary and tertiary levels, PBL is repeatedly adopted by only one instructor who tries to implement the approach in one course rather than as a curriculum designated for the department. Without assistance from the administrative level, teachers will always encounter challenges in the implementation of PBL in their respective classes. For these reasons, there is considerably a very low level of implementation of PBL at elementary, secondary and tertiary levels (Hung, Jonassen, & Liu, 2008).

Teachers play a significant role in PBL curriculum design. Bender (2012) argues that teachers, in making their first decision, must seek to know how the PBL relates the curriculum and determine the specific units of the curriculum that will be covered by the project and how long it will be used in their daily activity of teaching. Teachers would feel more comfortable when tasks related to PBL are adjuncts to one or more units of instruction within their curriculum.

Conclusion

Project-based learning, a crucial instructional approach, is one of the techniques used to foster the creative skills of the students in the teaching-learning process. It has been shown that in the 21st century, learners do not need to master and consume the lessons defined by the teachers based on the behavioral objectives. They need to learn more about how to face problems and get solutions. In order to foster creative skills in learners, teachers must not only be creative but also teach creatively. This activity is practically fulfilled when students are divided into groups and are given projects to realize in a limited amount of time. Through PBL, learners have the advantages of being involved in innovation, collaboration, and creativity to solve current and future problems.

The significance of PBL and creativity has been emphasized by a number of researchers. Haris (2013) found that through authentic projects, learners get more experiences and change their thinking. Krauss and Boss (2013) discovered that while engaged in PBL, students learn important life skills and capabilities that include "flexibility, organization, self-control, task initiation, time management, and metacognition (p.18). PBL enhances creativity and encourages research (Genc, 2015). It promotes creative thinking and integrity and offers responsive support of the spiritual sphere of the children (Haris, 2013). Wurdinger and Qureshi (2014) found that promoting PBL implies increasing the life skills of the students especially "problem solving, creativity, responsibility, communication, and self-direction." Furthermore, "PBL is an effective teaching methodology that motivates and inspires students to learn, as long as they engage in relevant projects" (p. 286). The importance of project-based and creativity at school is not to be over highlighted.

The most obvious critique of the PBL application is the fact that it needs much time for preparation of the project, the evaluation during the implantation and after (Requies, et al., 2018). However, making the method of PBLworldwide in the school curriculum and implementing it based on its components will increase the success of the students (Ergül & Kargın, 2014). As suggested by a number of authors, the school curriculum must include PBL and define the ways it is explored to foster the creative skills of learners. Further, teachers and learners need to be part of the curriculum committee while designing or improving a curriculum in general and particular when it comes to including the PBL to foster or encourage the skills needed in the society of 21st century.

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