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PROJECT-BASED LEARNING IN THE 21ST CENTURY: A REVIEW OF DIMENSIONS FOR IMPLEMENTATION IN UNIVERSITY-LEVEL TEACHING AND LEARNING

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Abstract: Project-based learning (PBL) is an innovative approach to learning that has recently been widespread across a breadth of disciplines in differing national contexts. This paper addresses a combination of theoretical and practical concerns over the implementation of PBL in the university-level teaching and learning context. In particular, the authors will examine to what extent PBL would benefit university-level learners in their learning. In terms of theoretical concern, the authors first look at how literature and society construct meaning for the concept of PBL. We then analyse and synthesize key features of PBL. Meanwhile, the practical side of PBL will be discussed in line with advantages of PBL in enhancing students' academic achievements, developing social skills, and promoting motivation and active learning as well as challenges in implementing PBL at university-level teaching and learning. Finally, we suggest implementation approaches associated with enacting PBL and intervention regarding improving its effectiveness in English language teaching and learning at university-level setting.

Keywords: project-based learning, academic achievements, cognitive skill, leaning motivation, active learning

INTRODUCTION

What Is Project-based Learning?

The concept of Project-Based Learning (PBL) is not new, but it has recently gained the spot light in education field. In the past decade, studies on PBL have increasingly been conducted and adopted across a diversity of educational institutions worldwide (Lehmann et al., 2008; Harmer and Stoke, 2014; Kolmos, 2009). Researchers have given a variety of definitions for PBL in which they all share several similar disciplines. In terms of its crucial functions, Stivers (2010) stated that PBL is an instructional approach which is built upon learning activities and real tasks that have brought challenges for students to solve. Bell (2010) therefore defined PBL as a student-driven (student-centred) approach to learning in which students are required to take part in a real project by developing a question or inquiry and under the supervision of teachers in order to create a project to share with the select audience (Challenge 2000 Multimedia Project, 1999). In other words, students involve designing their own inquiries, planning their learning, organizing their research, implementing a multitude of learning strategies, and evaluating their projects that have real-world applications beyond the classroom. These activities give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations (Railsback, 2002). When it comes to the teachers' role, Bell (2010) also expanded the definition of PBL to an approach in which teachers act as a facilitator.

Students work together under the teachers' supervision in which they oversee each of the process and approve each choice before the students embarks in a direction, toward a common goal (Bell, 2010). In short, PBL has originally developed from the root of constructivism theory in which learning is considered as a mental construction; that is, students learn by constructing new ideas or concepts based on their current or prior knowledge. This approach empowers learners to pursue content knowledge on their own, demonstrate their new understandings through a variety of presentation modes, and gain valuable skills that will build a strong foundation for their future in the global economy.

Objectives of the Study

Despite the effectiveness of PBL, it has not been always applicable to all levels of learners. There are a lot of research conducted as secondary or high school levels. In the Higher Education sector PBL is notably widespread in engineering; for instance in Denmark, most

engineering institutions incorporate PBL to some extent (Lehmann et al, 2008, Harmer and Stoke, 2014). A review of the literature also confirms its use across a breadth of disciplines in differing national contexts, including Media and Business Studies, Geography, Environmental Science, Education, Information Technology and Sustainability. Being a lecturer of English at Ho Chi Minh University of Technology and Education, the writer acknowledges the necessity of applying PBL in developing students' subject matter knowledge, enhancing their essential skills for the future together with a wish to change students' attitudes and emotions towards active learning as well as improving their learning outcomes, she aims at

- Examine what make problem-based learning effective in university-level teaching and learning.
- Figure out essential conditions/factors to implement problem-based learning in university-level teaching and learning.
- Come across challenges when applying problem-based learning in university-level teaching and learning.
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Research Questions

This study attempts to answer the following three main research questions:

1. Why is problem-based learning effective in university-level teaching and learning?
2. What factors contribute to the feasibility and success when implementing problem-based learning in university-level teaching and learning?
3. How can teachers and students reduce challenges when applying problem-based learning in university-level teaching and learning?

LITERATURE REVIEW

Key Features of Problem-Based Learning

Several main features of PBL are identified through literature in order to differentiate the approach from similar pedagogies such as problem-based learning, inquiry-based learning. There are seven key aspects that are distinct to Project-based learning as follows:

Active learning

The core focus of PBL is the idea that learning is the most effective when learners put theory into practice (Morgan, 1983, cited in Harmer and Stoke, 2014). As Stauffacher et al (2006, 255) stated, student role in PBL changes from “learning by listening to learning by doing”. He also explained that “the doing and learning are inextricable”. Actually, in PBL, students involve in a process of a lot of activities in order to deal with a real life problem and bring out a product including designing their own inquiries, planning their learning, organizing their research, implementing a multitude of learning strategies, and evaluating their projects.

Real-world problems

The feature of “real-world” in PBL has been accepted and discussed across the disciplines, and the concept of “authentic content” is the key of PBL (Thomas, 2000; Bell, 2010; Hanney & Savin-Baden, 2010). This task helps promote students’ interest and foster their motivation in learning under the connection between the academic purposes and external social, political, and environmental processes. “Real-world” problems are also presented in PBL when students are allowed to choose their own topics based on a current social or life situation under the facilitation of their teachers. Bell (2010) also insisted that the students’ choice of a topic, based on “questioned that have piqued their natural curiosity” (p.39). This task provides the project team chance to be more responsible for choosing and structuring their projects as they research real-world questions, pose solutions to real-world problems, and design real-world products in a rigorous way.

Teachers’ role as “A guide-on-the-side”

As a student-driven approach, the role of teacher or lecturer in PBL shifts from “sage-on-the stage” to “guide-on-the-side” (cited in Harmer and Stoke, 2014: 109 but original phrase from King, 1993). Teachers work as a “facilitator” or “mentor” in which they supervise learners’ whole process of conducting the project, so there will be more challenges for them, requiring additional training, support and resources. As Stauffacher et al. (2006: 255) explained “the teacher’s role changes from a distributor of knowledge to a process manager, helping students in their learning process by initiating reflection processes and supporting them, if necessary, on substantive matters”. Students’ role in PBL therefore would be more responsible for their own learning, they have to decide on topic, methods and determine their own learning needs, all of which are considered as the key characteristic of PBL.

Interdisciplinary

A further key feature of PBL is an emphasis on interdisciplinary (Otake et al., 2009; Hanney & Savin-Baden, 2013). It is the fact that in order to finish a project, students need knowledge as well as skills from across disciplines from the physical sciences to the natural and social sciences. This feature means that schools and teachers must equip students with adaptability and holistic thinking to tackle issues from different disciplines.

Cooperative learning

As a clear literature review, PBL is innovative by its emphasis on collaboration and group work which are central for the whole approach (Stivers, 2010). As Hanney and SavinBaden

(2013) explained “student activity revolves around a complex series of interactions between team members over time and draws on a range of key transferable skills such as communication, planning and team working since they co-plan their learning with the support of the teacher, research the literature, and as appropriate, meet with adult experts, build prototypes and conduct surveys and experiments, among other learning activities. This approach empowers learners to collaborate in teams, mentored by their teachers. Collaboration can also include partners external to academia (Stauffacher et al., 2006; Cheung & Chow, 2011) such as community groups (Jarmon et al. 2008) or corporates (Danford, 2006), or even an overseas consulate (Korfhage Smith, 2010), resulting in the development of further professional skills, behaviours and networks. However, apart from valuable skills, group work is also considered problematic when it holds potential conflict and student dissatisfaction.

An end product

In the PBL approach, students and teacher involve in a project, so at the end, students create tangible results to represent what they have learned (Stivers, 2010). Harmer and Stoke (2014) stated that a “quality product” is a “distinguishing feature of PBL” and one which “drives the project planning, production, and evaluation.”. The types of output is a significant emphasis and products vary from a standard academic dissertation or presentation, to a professional consultant report (Danford, 2006) to exhibitions such as fashion shows, reality TV shows, music videos, board games and production of a viral video for an external business client (Hanney, 2013). Danford (2004, 14) also argued that the products is usually shared, either among peers and academic staff of external audiences such as partners in the community or business sector.

Effectiveness of PBL

Incorporating projects into curriculum is neither new nor revolutionary; however, its benefits are inevitable in the process of teaching and learning. A teacher in Washington State who has used project-based instruction in his math and science classes reported that many students find meaning and justification for learning by working on project after a long period struggling in most academic settings. He also stated that by facilitating learning of content knowledge as well as reasoning and problem-solving abilities, project-based learning can help learners to prepare for state assessments and meet state standards. Brewster and Fager (2000) indicated that engagement and motivation from PBL lead to high achievement. 0 also agreed that PBL provides one way to introduce a wider range of learning opportunities into classroom. In general, there are six benefits that the author finds most significant to learners after introducing PBL in teaching and learning:

Students’ academic achievement

The effectiveness of PBL in academic has been proved by many studies. Especially, PBL has improve students’ test scores significantly on standardize tests of academic achievement in many schools and levels. Three elementary schools implemented PBL program in Dubuque, and after two years, two of these schools showed gains in the Iowa Test of Basic Skills from “well below average” to the district average; the third school showed a gain

equivalent from "well below average" to "well above the district average. Similarly, these improvement scores occurred at a time when the percentage of limited English speaking students increased in a middle school from 6% to 22% (ELOB, 1999a), and these gains did not level out but increased an average of 25 additional points the following year (ELOB, 1999b).

Students' understanding of subject matter

One of the most powerful designs for conducting research on instructional practices involves comparing students' performance on some criterion measure before and after an experimental treatment. One typical research of this type was conducted by Boaler (1997) in a mathematic school in three years. After the treatment, students at the project-based school performed as well as or better than students at the traditional school on items that required rote knowledge of mathematical concepts, and three times as many students under the PBL program as those in the traditional learning attained the highest possible grade on the national examination. Overall, significantly more students at the project-based school passed the national examination administered in year three of the study than traditional school students. Also, students at the project-based school outperformed students at the traditional school on the conceptual questions as well as on a number of applied (conceptual) problems developed and administered by Boaler. According to him, "Students taught with a more progressive, open, project-based model developed more flexible and useful forms of knowledge and were able to use this knowledge in a range of settings."

Students' gain in understanding relating skills and strategies in 21st century

Students who are engaging in stimulating projects are exposed to and developed a wide range of skills and competencies such as collaboration, critical thinking, project planning, decision making, time management skills, social and communication skills, and problem-solving skills. With projects, students use higher order thinking skills rather than memorizing facts in an isolated context without a connection to how and where they are used in the real world. Furthermore, while some of these skills are self-reported through student surveys or other methods of evaluation, at other times the evidence for their development is not clearly stated.

Students' positive attitudes toward learning

When assessing the effectiveness of PBL, academic results are a good indicator to measure success. However, PBL also can change a variety of skills and learners' attitudes that may not be measured using standardized testing. One of the major positive attributes associated with PBL is the engagement and motivation which are represented in teachers' note on their improvement in attendance, more class participation, and greater willingness to do homework. Ames (1992) discovered that students who possess a motivational drive that focuses on learning and mastery of subject matter have a higher potential to stay focused with schoolwork than students who merely complete assigned work. Additionally, Blumenfeld et al., (1991), points out that PBL has variety, student choice and authentic problems that promote students interest in a topic. The Academy for Educational Development (AED) looked at attendance rates and saw PBL participating schools increase attendance rates over

90 (1999). One elementary school in Cincinnati increase attendance rates from 75% to over 95% after the implementation of new programs, and a significant decrease in rates of disciplinary problems. Another group of students worth acknowledging in regards to PBL are students who have learning difficulties or learning barriers such as English language learners (ELL). Since many PBL activities are collaborative and communicative, it allows an ELL student to ask their teacher or working partner for clarification or definition. Most importantly, it gives an ELL student time to process the English barrier and focus on the content to be learned. Moreover, since PBL projects are open in nature, this allows ELL students to use multiple resources to help with their understanding and multiple methods to show the intended content as well. PBL challenges students to use resources and methods that may not have been presented by an educator. ELL students using PBL can look to challenge themselves to learn a language quicker, instead of avoiding embarrassment and remaining unheard.

Perceived changes in work habit and other PBL process behavior

Apart from these above mentioned benefits, PBL also bring positive changes in students' work habit and other PBL process behavior. It provides opportunities for students to contribute to their school or community. Students' self-esteem is also raised thanks to projects they get involved in. PBL enables students to make and see connections between disciplines as well as allow them to use their individual learning strengths and diverse approaches to learning.

Project-Based Learning In Language Teaching And Learning

Research has shown project-based learning (PBL) to be an effective learning method in many ways. Although PBL learning has been studied extensively and a number of papers have discussed the merits of implementing PBL in educational environments, greater emphasis should be given on how it can be adapted to teach language effectively in secondary education.

A research named "Project-Based Learning in the Teaching of English as A Foreign Language in Greek Primary Schools: From Theory to Practice" was conducted in Greece State Primary Schools by Fragoulis and Tsiplakides (2009). Fifteen sixth grade students and two primary teachers participated in the study with the aims at implementing project work in order to make students aware of the history of the area in which they live, and use it as a mechanism for cross curricular, and interdisciplinary work, as well as to make use of new technologies. The study emphasized on the benefits of the project work on cognitive, emotional and psychomotor aims by most students. More specifically, in relation to language skills, most learners' willingness to participate in learning activities increased. At the end of the school term, most students showed an improvement in all four language skills. Their speaking and listening skills, in particular, had the greatest improvement. In addition, students gathered a wealth of information about local history from a variety of sources (books, interviews, and the internet), learned a lot about local history, and gained in depth understanding of issues related to local history. Most students' communicative competence developed, mainly discourse competence, their grammatical competence "knowledge of lexical items and of English Language Teaching September, rules of morphology, syntax,

sentence-grammar semantics and phonology” (ibid), and sociocultural competence (using language in a social context) showed less improvement, though. And finally, their social skills and collaborative skills improved dramatically, which is consistent with findings in other studies (Coleman, 1992). After the project work students knew that being a team member entailed certain obligations, most of them developed skills for solving in-group conflicts, and learned to be responsible in relation to the roles assigned to them. Most importantly, all students, regardless of language performance, or motivational intensity seemed to have developed their cooperative skills. Also, their computer skills improved, mainly, the ability to use the internet to search for information.

Another study conducted by Astawa, Artini, and Nitiasih (2017), namely “Project-based Learning Activities and EFL Students’ Productive Skills in English” put more attention to the effect of Project-Based Learning on students’ English Productive Skills and how the activities influence teaching and learning process in a public junior high school in Bali-Indonesia. Twenty-eight students of the seventh grade participated in this study which is embedded mixed-method which focuses on collecting, analysing, and mixing both quantitative and qualitative data. The findings of the study were discussed in terms of speaking, writing skills, and the teaching and learning process. Especially, the findings showed that PBL could promote students’ enthusiasm, confidence, creativity, self-esteem and collaborative learning ability. Students’ action in the classroom shows that they enjoyed the learning process, considering on their active participation throughout the lesson. The twenty-eight participants who responded to the open-ended questionnaire showed willingness and enthusiasm to participate in the learning process. They worked in groups and create a project collaboratively. Their enthusiasm was confirmed through an interview conducted after the class. In relation to students’ learning process, it was evident that students’ confidence appeared as the result of the implementation of Project-Based Learning. The results also show that PBL influenced students learning process by promoting their creativity on learning. The learners were assigned to work on a project which promotes their higher order thinking skills. Students’ self-esteem and collaborative learning skills are also influenced by PBL. It was evident that students were not only aware for the need to learn together as a group/team but also the initiative and responsibility for their own learning. While working in a group, the students may be involved in asking and answering questions, giving opinion about other people/group work, sharing information, evaluating other student’s /group’s work, expressing ideas, monitoring team work, actively interacted to make decision, etc. Individually, each student was given a chance to select and manage their own work. These activities can be expected to maximize independent and self-directed learning. From teacher’s perspective, PBL promotes self-motivation and satisfaction in teaching. This research found that the teacher considered PBL as an effective strategy to teach the students and gave positive feedback to students’ participation and achievement. This research also found that the English teacher had strong motivation to implement PBL in the classroom for three reasons: first, the students were fully engaged in the classroom activities so that student-centred learning came into play; second, the students showed good responses toward the learning process; and finally, the teacher had the feeling of satisfaction as the results of positive responses of the students and the conducive learning atmosphere.

Implementing Project-based learning in University-level Teaching of Language

Project-based learning has been investigated in a great number of studies on the global scale over the last decade, but the application of this approach to teaching English as a foreign language in Vietnam is still not popular. With a view to achieving great successes in teaching and learning under the credit-hour system, training workers of the twenty-first century standard, PBL is a beneficial approach to be applied at university in Vietnam. Projects come from different sources and develop in different ways. There is no one correct way to implement a project, but there are some questions and things to consider when designing effective projects (Edwards, 2000). Aware of the importance of PBL, the author proposes the following four phases for implementing a project work in university level for language teaching and learning:

Preparation before the project

A high degree of preparation is a necessity for PBL. In order to implement a project, several aspects need to be considered and prepared well. First, it is the teachers' role to make sure the project goals are in line with the curriculum objectives. It is very important for everyone involved to be clear about the goals so that the project is planned and completed effectively. The teachers and the students should develop an outline that explains the project's essential elements and expectations for each project. The project therefore required to have clearly stated goals and to support and demonstrate content learning both process and product in order to successfully integrate the content learning. Second, a clearly defined skills as well as concepts that learners will learn during the project should be identified before the project is started. Be as specific as possible in determining outcomes so that both teachers and students understand exactly what is to be learned. Teachers should also have an organized framework, time and materials as well as offer equal opportunities for every student to develop such skills as effective collaboration, persuasive presentation, researching information and ideas, problem-solving skills. Finally, teachers should have an adequate assessment on the project based on clearly defined standards, students' reflection and revision, in which they can measure how well students complete the project and how the project's outcomes meet the learning goals in terms of students' knowledge and competencies.

Planning and organizing to start the project

At this step, the students and teacher reach a consensus on a project theme. There are many types of effective projects. Some projects can address a specific community or school need, transform existing work experiences or jobs into projects, or develop a project based on classroom curriculum. Other project can focus on career research. The projects range from structured, semi-structured, to unstructured in terms of the degree to which the teacher defines the project; the teacher therefore should work out the ways in which students can develop some sense of ownership toward the project. The possibilities for projects are endless. The key ingredient for any project idea is that it is student driven, challenging, and meaningful. Moreover, teachers do not let students become the sole decision-makers about what project to do, nor do teacher sit back and wait for the students to figure out how to go about the process, which may be very challenging. This is where the teachers' roles as facilitator or mentor or coach play a very important part in the success of a project. The

teacher will have selected the theme and brainstormed ideas with students to come up with project possibilities, discuss possibilities and options, and be ready to support them from the opening activity to the implementation process.

Implementing the project

In this step, since teachers are aware of students' levels, he/she prepares instructional activities for each of the information-gathering task. Most work is conducted by students after being provided with the language, skills, and strategy demands. They can use a variety of methods such as interviewing, questionnaire, letter writing, and library searches. Next, the teacher should help the students master the language, skills, and strategies needed to compile, analyze, and synthesize the information that they have collected from different sources. Then, students start to work in groups, organize and analyze information from data they have collected, and decide to keep or discard any information that is critical or unnecessary for the completion of the project.

Completing and evaluating the project

The first thing teachers can do in this phase is to help students prepare essential language skills and activities that are helpful in presenting the final outcome of the project. The activities may concentrate on skills for oral presentations, effective written revisions and editing, persuasive debates, and the like. In order to complete the project, students are required to present their project in the ways that are already set from the preparation and planning phase and also depending on types of projects they choose to make at the beginning. Finally, teachers' assessment and students' self-evaluation are crucial in determining how successful the project is and how well students learn from the project in terms of language improvement and content learning or subject matter. Students should reflect on what they have learned and improved during the project. They are also asked to make recommendations that can be used to enhance similar projects in the future.

Challenges in Implementing PBL

The researcher, however, shows that teachers who implement PBL sometimes face challenges that can limit its effectiveness. Often, these challenges focus on subject content and more on the management of projects, especially in terms of time, scope, and quality.

Challenges for students undertaking PBL

The most significant challenge faced by learners undertaking PBL. There are many researchers reported team work as being the hardest element of their project work (Meehan & Thomas, 2006; Staffacher et al., 2006). Difficulties with group work are attributed to lack of experience and understanding of the values of collaborative work, especially among high achieving individuals. Another problem with group work might belong to cultural factors which influences team dynamics. Moreover, a lack of prior training and larger group size complicated communication and division of work. Students' difficulties with group work also impact on staff and literature notes concerns regarding the time/resource-intensive nature of group work, particularly for staff in evaluating individual contributions in a group setting.

Challenges for academic staff

Staff members also face some similar difficulties mentioned with students. However, their new role of facilitator and time and resource needed for PBL are the two most significant aspects. Teachers who implement PBL in their classes encounter anxiety and resistance towards their new role as facilitator in student-centered PBL. Lecturers struggled with the shift from being an imparter of knowledge to one of a mentor or facilitator and recommended the input of pedagogical trainers. The literature also suggests that PBL is challenging for staff in terms of finding a balance between need for input and allowing students the freedom to explore and experiment. Similarly, teachers may be unsure about how much scaffolding to provide and a lack of staff confidence regarding choice and implementation of appropriate methods of assessment (particularly formative assessment), which sometimes meant a focus on summative assessment and consequent heavy workloads for students and staff (Graham, 2010). Cultural factors and social contexts may also play a part in teachers' beliefs about their role, with attitudes varying across national borders. Time and resource intensive nature of PBL is another significant challenge identified. It is the time taken to develop PBL module, project guidance and ongoing formative and sometimes complex combining of assessment, identifying and developing appropriate problems and projects. Furthermore, a need for significant numbers of trained facilitators and a lack of available resources such as materials equipment and teaching/project space is also noted time-intensive for teachers and staff.

CONCLUSION

Project-based learning is a key strategy for creating independent thinkers and learners. The introduction and application of PBL bring out a lot of unquestionable benefits for not only learners and teachers. In the future, students must enter a workforce that they will be assessed on their performance. They will be evaluated not only on their outcomes, but also their collaborative, negotiating, planning, organizing, critical thinking skills and others. By implementing PBL in education, especially in language teaching and learning, teachers and schools are preparing our students to meet the twenty-first century with adequate subject matter, content knowledge, preparedness and a repertoire of skills they can utilize successfully. Teachers also benefit from PBL in their professional development and chance to have deeper understanding of their own expertise and specialized knowledge. The implantation of PBL is challenging; however, if both teachers and students determine clearly their own roles and responsibilities, PBL is absolutely the best method in education.

REFERENCES

- Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of educational psychology*, 80(3), 260.
- Astawa, N. L, Artini, L. P, & Nitiasih, P. K. (2017) Project-based Learning Activities and EFL Students' Productive Skills in English. *Journal of Language Teaching and Research*. 8 (6), Pp. 1147- 1155.
- Bell, S. (2010) 'Project-Based Learning for the 21st Century: Skills for the Future'. The Clearing House: *A Journal of Educational Strategies, Issues and Ideas*, 83 (2). Pp 39-43.

- Brewster, C., & Fager, J. (2000). *Increasing student engagement and motivation: From time-on task to homework*. Portland, OR: Northwest Regional Educational Laboratory. Retrieved June 25, 2002, from <http://www.nwrel.org/request/oct00/index.html>
- Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational psychologist*, 26(3-4), 369-398. Coleman, J. A. (1992). Project-based learning, transferable skills, information technology and video. *Language Learning Journal*, 5, Pp. 35-37
- Challenge 2000 Multimedia Project. (1999). *Why do projectbased learning?* San Mateo, CA: San Mateo County Office of Education. Retrieved June 25, 2002, from <http://pblmm.k12.ca.us/PBLGuide/WhyPBL.html>
- Cheung, S. M. & Chow, A. T. (2011) 'Project- based learning: a student investigation of the turtle trade in Guangzhou, People' s Republic of China'. *Journal of Biological Education*, 45 (2). Pp. 68-76.
- Danford, G. L. (2006) 'Project-based Learning and International Business Education'. *Journal of Teaching in International Business*, 18 (1). Pp 7-25.
- Edwards, C.P., Gandini, L., & Forman, G.E. (Eds.). (1993). *The hundred languages of children: The Reggio Emilia approach to early childhood education*. Norwood, NJ: Ablex.
- Korfhage Smith, R. (2010) 'A Case Study in Project-Based Learning: An International Partnership'. *Journal of Teaching in International Business*, 21 (3). Pp 178-188.
- Fragoulis, I., & Tsiplakides, I. (2009) Project-Based Learning in the Teaching of English as A Foreign Language in Greek Primary Schools: From Theory to Practice. *English Language Teaching*. 2 (3). Pp. 113-119.
- Lehmann, M., Christensen, P., Du, X. & Thrane, M. (2008) 'Problem-oriented and project-based learning (POPBL) as an innovative learning strategy for sustainable development in engineering education'. *European Journal of Engineering Education*, 33 (3). Pp 283-295.
- Jarmon, L., T. Traphagan, et al. (2008). "Understanding project based learning in Second Life with a pedagogy, training, and assessment trio." *Educational Media International* 45(3): Pp. 157 176.
- Graham, R. (2010) 'UK approaches to engineering project-based learning'. White Paper sponsored by the Bernard M. Gordon/MIT Engineering Leadership Program. [Online]. Available at: <http://web.mit.edu/gordonelp/ukpjblwhitepaper2010.pdf>
- Hanney, R. & Savin-Baden, M. (2013) 'The problem of projects: understanding the theoretical underpinnings of project-led PBL'. *London Review of Education*, 11 (1). pp 7-19. King, A. (1993) 'From Sage on the Stage to Guide on the Side'. *College Teaching*, 41 (1). Pp 30-35.

- Harmer, N., & Stoke, A. (2014) The benefits and challenges of project-based learning: A literature review. *Pedagogic Research Institute and Observatory (PedRIO)*. Plymouth University.
- Morgan, A. (1983) 'Theoretical Aspects of Project-Based Learning in Higher Education'. *British Journal of Educational Technology*, 14 (1). Pp 66-78.
- Thomas, J. W. (2000) '*A review of research on project-based learning*'. [Online]. Available at: http://w.newtechnetwork.org/sites/default/files/news/pbl_research2.pdf (Accessed: 18.6.2014).
- Railsback, J. (2002) Project-based Instruction: Creating excitement for learning. Northwest Regional Education Laboratory.
- Stauffacher, M., A. Walter, et al. (2006). "Learning to research environmental problems from a functional socio-cultural constructivism perspective: the transdisciplinary case study approach." *International Journal of Sustainability in Higher Education* 7(3): Pp. 252-275.
- Stivers, L. (2010) Project-based learning. *Education Psychology*.
- Otake, M., Fukano, R., Sako, S., Sugi, M., Kotani, K., Hayashi, J., Noguchi, H., Yoneda, R., Taura, K., Otsu, N. & Sato, T. (2009) 'Autonomous collaborative environment for project-based learning'. *Robotics and Autonomous Systems*, 57 (2). Pp 134-138.