

PROJECT-ORIENTED PROBLEM -BASED LEARNING (POPBL): AN INITIATIVE TO ENRICH SOFT SKILLS AMONG STUDENTS AT A PUBLIC UNIVERSITY

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Abstract

This paper discusses the implementation of Project -Oriented Problem -Based Learning (POPBL) at a technical-based university in the East Coast of Malaysia. The POPBL was employed to incorporate the theoretical knowledge and application of soft skills among students. This paper meant to report (i) challenges encountered by students in the process of POPBL's implementation and (ii) students' attitude in managing hindrances to complete the task. Observation was made during Soft Skills course offered to 3rd year undergrads. The groups encompass of various faculties were formed into small group of 6-7 members. Every 15 smalls groups were supervised by a lecturer. Along the 14-week course, students were required to do; (i) a survey and identify a problem based on designated theme, (ii) designed a project proposal complete with an action plan to solve the identified problem and, (iii) prepare a complete report furnished with related documents and images. Assessment on technical aspect was based on project proposal and final report, while Soft Skills applications were observing through work process i.e., work progress (Leadership Skills), task distribution and coordination (Team Working), flow of communications (Communication Skills) time management (Ethics and Moral Professional) and quality of solution (Critical Thinking and Problem Solving). The findings advocate that on the technical aspect, students were moderately able to prepare a project report but they need lots of assistance in preparing project proposal particularly in analyzing and identifying a problem. On Soft Skills application aspect, most students reported an adequate skills expansion particularly their team working and communication. The higher and low performers were captured via four progress meetings series conducted by the lecturers in charge. However, it was difficult to ascertain the level of performance for the average students due to disability of peer assessors to capture actual performance due to pity

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Introduction

As Malaysia is determined to be a developed country by 2020, undeniably her potential human resources are demanded to be technically robust and highly persistent. Correspondingly, the country's rapid development and industrialization demand not just highest technical skills, but similarly soft skills such as communication, team working, critical thinking, problem solving, leadership, ethics and moral professional and entrepreneurship skills. These skills are proven essential both to secure position in a company, and also to remain working progressively. Nevertheless, those qualities are not attainable only by understanding the theory or listening to stories, they have to be hands-on.

The recent employability data of Malaysian graduates indicated a decreasing rate, and this is especially true with graduates from the local universities. Among the concerns conveyed by employers is poor soft skills or employability skills among the graduates. At a public university in Malaysia, an industrial soft skills course is specifically developed to assist graduating students to enhance and empower their soft skills. The program is already in its third academic cycle, but the success rate does not contribute significantly to the employability rate of the graduates at the university.

The project-oriented problem -based learning (POPBL) is a teaching-learning method that promotes deeper learning, and learning by doing (Coyle, 1999; Fergus et al., 2008). Studies revealed that the implementation of POPBL is able to expose students to experiential learning in which they able to experience and practice the skills to be enhanced. Problem solving skills (Du, de Graaff & Kalmos, 2009), team working skills (Ahmad & Jabbar, 2007), and communication skills (Garcia, Ferré & Medinilla, 2009) are among skills which have been investigated using POPBL and found to be an effective teaching-learning approach. We therefore sought to implement the use of POPBL as a teaching-learning approach in the soft skills program aiming to improve students' soft skills and indirectly assist students with the employability opportunity. This paper reports the challenges encountered by students in the process of POPBL implementation and students' attitude in managing hindrances to complete the POPBL task.

Literature Review

Project-oriented problem-based learning (POPBL) is an educational model, which emphasizes students' ability to define and solve real-world technical problems and its non-technical aspects (Lehmann, Christensen, Du & Thrane, 2008), and cultivate student-centred instructional process focusing on practical tasks (Uziak, Oladiran, Eisenberg & Scheffer, 2010). The key features of POPBL are therefore student-centred, self-directed and collaborative learning that focuses on real-world issues and may involve stakeholder engagement (Brundiars & Wiek, 2011; Savery, 2006).

POPBL originates as the consequence of finding new directions for what is lacking in Problem-based learning (PBL). Earlier researches of this educational model suggested that both PBL and POPBL commenced at the Aalborg University, Denmark, and it is currently available for the past thirty years (Mills & Treagust, 2003; Savery, 2006). And for many years, POPBL has become the guiding principle in the academia especially in the engineering fields for its problem-driven and solution-oriented approaches (Wiek, Xiong, Brundiars & van der Leeuw, 2014). Other educational fields which also employ POPBL include health sciences, architecture, and business (Savery, 2006).

Within Malaysia educational context, POPBL has also been researched and implemented. The implementation of POPBL at Malaysian higher educational institutions include within the environmental engineering (Yusoff, Ng, Keng & Mohamad, 2011), electrical and electronic field (Ahmad & Jabbar, 2007; Mohamed, Jubadi & Zaki, 2011) and computing field (Ibrahim & Halim, 2013), to promote creativity and technological-creativity (Yasin, Mustapha & Zaharim, 2009, Yasin, Rahman, Jusoff, Mohd Yunus, Minghat, 2011), and to develop soft and generic skills (Baharom & Palaniandy, 2013).

The fundamental theory for the implementation of POPBL in this case is the constructivist-sociocultural approach (Kolmos & de Graaf, 2007). The particular theory emphasizes three learning principles which are cognitive learning, collaborative learning and contents. The cognitive learning principle is a focal principle in boosting motivation and eagerness to participate. Learning took place when dealing with problem or challenges by doing the project. The collaborative learning principle is in the team-based problem solving where learning process is in the form of social act through communication. Students learn by sharing knowledge and collectively build the knowledge. The contents principle is related to interdisciplinary learning which is not bounded by one single subject.

Other learning theories and principles that support the application of POPBL as technique to improve student's performance are Experiential Learning (Dewey, 1997) as well as Social Cognitive Theory (Vygotsky, 1978). The related learning principles are Kolb's Experiential Learning (Kolb, 1984) also the How People Learn (HPL) Framework (Bransford et al., 1999).

Methodology

Participants

Participants were male and female students engaged to Civil engineering faculty, Computer programming faculty, Industrial management and Chemical engineering faculty. Participants were 140 students where N=49 were from FKASA, N=25 from FIST, N=24 from FSKKP, N=23 from FIM and N=19 from FKKSA.

Instrument

A self-constructed questionnaire was employed to find out students' perception towards the newly introduced approach, and how it helped them to enhance their Soft Skills. There were also items in the questionnaire that require students to name other Soft Skills that they think instantaneously enhanced through the POPBL process. Questionnaire was completed by students before they were allowed to present their report. The questionnaire comprises of two sections. Section A inquires the participants' demographics information and section B contains four open ended questions related to students' perception on the usage of POPBL as teaching-learning approach and type of Soft Skills enhanced through the process.

Description of the Course

The Industrial Soft Skills course is a university requirement course offered to all third year students and those who have passed their basic Soft Skills course. These students are those who are preparing for their Industrial attachment (LI) and going through the POPBL should expose them to various pressure and conflict resolution that might become handy in the future. This course requires no formal classes, yet each group has to arrange four progress meeting with the facilitators.

For the implementation of POPBL, students were expected to conduct a survey for problem detection, prepare a proposal paper (complete with Gantt-chart of plan activities, task distribution and task descriptions) of the proposed solution, implement the plan of action accordingly, attend progress meetings, submit reports and all related documents. The project also needs to fulfil these requirements: (i) obvious application of Soft Skills (ii) knowledge transfer (ii) community engagement and (iv) well managed (abide to due dates, task distribution, plan of action) and well documented.

Result and Discussion

Enhanced Soft Skills through POPBL

Figure 1 illustrates that the participants perceived POPBL was able to enhance their Soft Skills, particularly their teamwork skills N=117 (83%) and communication skills N=109 (77%). This finding is rather practical as team-working requires communication in addition to other requirement such as commitment and clear goal.

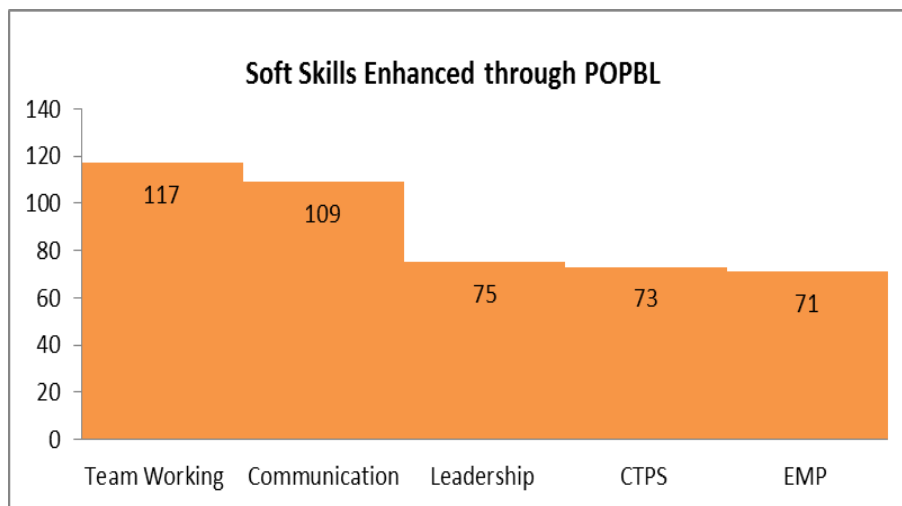


Figure 1. Soft Skills enhanced through POPBL

A team of people working together for a common purpose have been a centrepiece of human social organization. It is something that human should do when resources are limited and demand goes high. The essence of this spirit is obviously in place through POPBL when students had to work in team to accomplish the task within time without sacrificing the quality of the task. The current research findings are supported by Hassall (2009), who suggested that production tasks or the expected result have a significant relationship with the level of communication between team members, the desire to achieve the goal within time urges them to communicate well.

Teamwork and communication are inseparable particularly when it deals that is valuable (past or fail) and they are moreover vital when live and deaths are at risk. Communication breakdowns and teamwork failures have been identified as key contributing factors in the occurrence of patient safety incidents; conversely, effective teamwork and communication has been cited as essential for achieving high reliability systems and creating a “culture of safety” to support the safe delivery of patient care (Leonard, Graham & Bonacum, 2004).

Additional Skills Enhanced through POPBL

Figure 2 depicts other Soft Skills elements that surfaced through the application of POPBL, which include self-fulfilment (32%), resource management (23%) and social awareness (11%). These findings directly suggest that at least two intended Soft Skills elements were obviously improved simultaneously through the activity. And interestingly enough, the presence of self-fulfilment and resource management were also greatly sensed by the students.

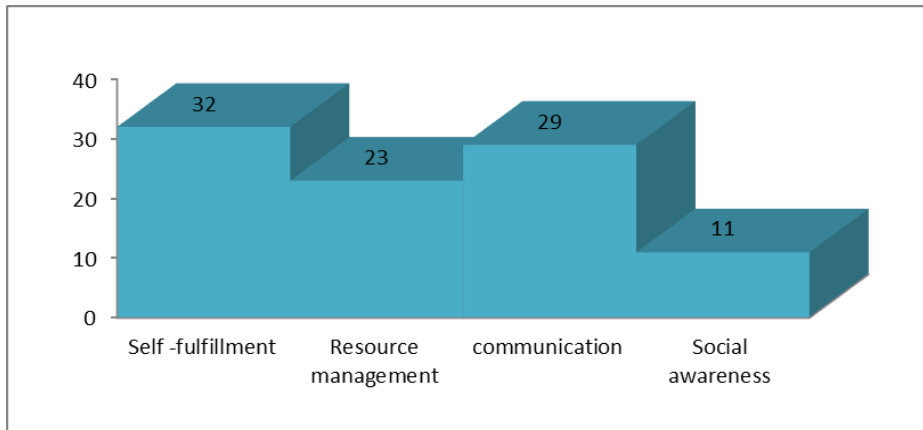


Figure 2. Additional element perceived to be improved through POPBL

Self-fulfilment is a feeling of being happy and satisfied due to the ability of a person to fully utilizing his/her abilities and talents. It is both a process and a product, the process consisting in an unfolding of certain implicit powers or intrinsic values that marked by choice, creativity and capacity development. Meaning to say, self-fulfilment actualized potentialities (Alan, 1998). Quaglia and Cobb (1996) said that development of aspiration is vital during adolescence as it can reflect an individual ability to identify and set goal for the future. With regard to students' aspiration, it motivates actions to achieve success in studies and eventually goals in pursuit of career or educational opportunities (Bajema, Miller & William, 2002).

Students also incline to develop their social and cognitive skills through social interaction with others. By doing POPBL, students were interacting with peers who have various personalities and backgrounds. During that process, students' ability to engage in debates and actively confront differences among them to look for the best ideas teaches them the value of dialogue (Piaget, 1975). Additionally, they nurture the ability to manage strong emotions that might engender unpleasant conflict. These cognitive and affective processes are relevant to the development of the dimensions associated with our social awareness measurement.

Interestingly, Tsui (2000) posits that social awareness and consciousness, along with political awareness, directly influences college students' development of critical thinking skills. Tsui (2000) concluded "awareness of political and social affairs may be relevant to critical thinking development because discussion about such topics tend to elicit more interest and participation among students (p. 432)." Other research suggests that students who possess critical thinking skills demonstrate a greater degree of social and political consciousness. These students demonstrate a political awareness or concern for general social issues rather than a concern with their own world and immediate social group (Hurtado et al., 2002).

Difficult Stage in the POPBL Implementation

Figure 3 shows that proposal stage was perceived as the most difficult phase in the process of applying POPBL. This is probably because as POPBL urges one to be critical in analyzing situation, identifying problem and suggesting solution. Those skills unfortunately were not exposed to students sufficiently. Research in Western Europe and United States of America suggested that the level of critical thinking among students in higher education is low (Guest, 2000; Van Gelder, 2005). Accordingly, Rosnani and Suhaila (2003) stated that after 11 years of schooling, students are unable to apply the content knowledge acquired in school to real –world problems.

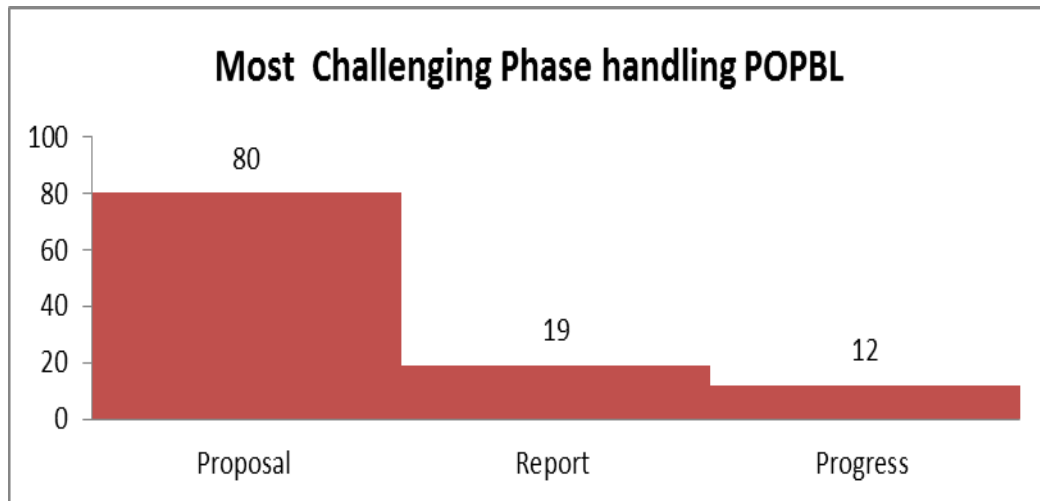


Figure 3. Most Challenging phase handling POPBL

Additionally, Figure 4 reports that time management, decision making, and language and budget constraints are main obstacles and the most challenging in the process is preparing the proposal. The result might be true as students were working in team and each member has different background and inclination. Moreover, they came from various faculties. With only 14 weeks to stretch on and limited funding (RM300.00) all kinds of difficulties possibly surfaced. Although the experience was horrific for certain students, this situation indirectly pushing them to maximize all the resources and minimize what is possible. The budget for example, they have to use their own money to start the program and thus, unnecessary expenditure was avoided. At the end, most of the projects were organized successfully with minimum budget.

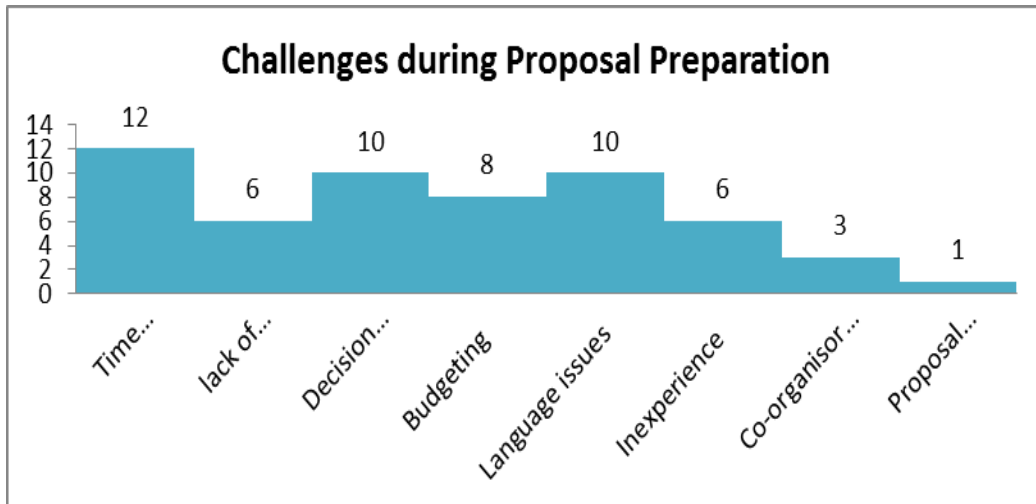


Figure 4. Challenges during Proposal Preparation

Conclusion and Recommendation

The survey results proposed that students were able to achieve the course objectives particularly CO1 (Explain the importance of Soft Skills in the work place) and CO2 (Demonstrate Soft Skills elements through project). It was in fact; enhanced students' humanities quality and direct exposure dealing with real problem, real people and authentic challenges. Subject performance furthermore for the particular semester was slightly improved compare to the previous semesters.

Students perceived POPBL as platform to improve their team working and communication skills. Nonetheless, results also suggested that students have huge difficulties in drafting the proposal. The current findings were in accordance to result of MY3S (2014) saying that our university students are leaking in CTPS. For that matter, there is one issue that can be examined in the next studies i.e., would the students be able to minimize difficulties or shorten the timing in preparing the proposal if they were exposed to critical thinking and problem solving technique beforehand?

The result possibly be strengthening if all lectures in charge were abide to due dates, follow the POPBL guide, arrange progress meetings with their students as scheduled and carefully supervised students' reflection writing throughout the semester. As team working and communication was perceived to be improved through POPBL, it is recommended that POPBL should be employed in all suitable academic subjects. Students' affaires and development division might utilize this approach or emphasis more on developing critical thinking when students proposing an activity. That is to ensure core competency of the students are attain.

When graduate employability (GE) determines the university budget and the relevant existence of a university, it is desirable that we do everything necessary to provide our graduates the knowledge and skills to survive the demands of the job market. POPBL approach is in line with government recommendations to produce entrepreneur that able to create employment opportunities for others. Additionally, as problem is the mother of creativity, exposure to skills related to framing problem and problem solving techniques should help our students to see problem as opportunity to excel.

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References

- Ahmad, Afandi and Jabbar, Mohamad Hairol (2007) *POPBL experience: a first attempt in first year electrical engineering students*. In: 2nd Regional Conference on Engineering Education (RCEE 2007), 3-5 December 2007, Johor Bahru.
- Alan, G. (1998). *Self fulfilment*. New Jersey: Princeton University Press
- Bajema, D.H., Miller, W.W. & William, D.L. (2002). Aspiration of rural youth. *Journal of Agricultural Education*, 43(3), 61-71.
- Bransford, J.D., Brown, A.L., Cocking, R.R. (Eds). (1999). *How People Learn: Brain, Mind, Experience, and school*. Washinton D.C: National Academi Press.
- Brundiers, K., & Wiek, A. (2011). Educating Students in Realworld Sustainability Research: Vision and Implementation. *Innovative Higher Education*, 36(2), 107–124.
- Coyle, D. (1999). Theory and planning for effective classrooms: Supporting students in content and language integrated learning contexts. In J. Masih (Ed), *Learning Through a Foreign Language*. London: CILT.
- Dewey, J. (1997). *Experience and Education*. New York: Touchstone.
- Du, X. Y., de Graaff, E. & Kolmos, A. E. (Eds.). (2009). *Research on PBL Practice in Engineering Education*. Rotterdam: Sense Publishers.
- García, M., Ferré, X., & Medinilla, N. (2009). Experience In Developing Communication Competences In POPBL With a Multidisciplinary Focus in the Computing Engineering Curriculum. *ICERI2009 Proceedings*, 3533-3548.
- Guest, K. (2000). Introducing Critical Thinking to Non-standerd Entry Students: The Use of a Catayst to Spark Debate. *Teaching in Higher Education* (5), 289-299.
- Hassall, S. L. (2009). *The relationship between communication and team performance: testing moderators and identifying communication profiles in established work teams*. PhD thesis, Queensland University of Technology.
- Hurtado, S., Engberg, M.E., Ponjuan, L. & Landerman, L. (2002). Students' Precollege Preparation for Participation in A Diverse Democracy. *Research in Higher Education*, 43 (2), 163-168.
- Ibrahim, N., & Halim, S. A. (2013). Implementation of Project-Oriented Problem-Based Learning (POPBL) in Introduction to Programming Course. In the Proceedings of the 4th International Research Symposium on Problem-Based Learning (IRSPBL) 2013, PBL across Cultures, 279-288.
- Kolb, D. (1984) *Experiential Learning, Experience as the Source of Learning and Development*, Englewood Cliffs. NJ: Prentice Hall.
- Kolmos, A. & de Graaff, E. (2007). Process of Changing to PBL. In de Graaff, E. & Kolmos, A. (Eds.) *Management of Change Implementation of Problem –Based Learning in Engineering* (pp.31-44). Rotterdam: SENSE Publisher.
- Lehmann, M., Christensen, P., Du, X., Thrane, M. (2008). Problem-oriented and project-based learning (POPBL) as an innovative learning strategy development in engineering education. *European Journal of Engineering Education*, 33(3), 281-293.
- Leonard, M., Graham, S. & Bonacum, D. (2004). The human factor: the critical importance of effective teamwork and communication in providing safe care. *Qual Saf Health Care*, 13(1), 85-90.
- Mills, J. E., & Treagust, D. F. (2003). Engineering education—Is problem-based or project-based learning the answer. *Australasian Journal of Engineering Education*, 3(2), 2-16. Available at http://www.aaee.com.au/journal/2003/mills_treagust03.pdf.
- Mohamed, M., Jubadi, W. M., & Zaki, S. W. (2011). An Implementation of POPBL for Analog Electronics (BEL10203) course at the Faculty of Electrical and Electronic Engineering, UTHM. *Journal of Technical Education and Training*, 3(2), 45-53.
- Rosnani, H., & Suhailah, H. (2003). *The Teaching of Thinking in Malaysia*. Kuala Lumpur: IIUM Publication.

- Quagli, R.J. & Cobb, C.S. (1996). Toward a theory of student aspiration. *Journal of research in rural education*, 12(3), 127-132.
- Savery, J. R. (2006). Overview of problem-based learning: Definitions and distinctions. *Interdisciplinary Journal of Problem-based Learning*, 1(1), 3.
- Tsuei, L. (2000). Effect of campus culture on Students' critical thinking. *The review of Higher Education*, 23(4), 421-441.
- Uziak, J., Oladiran, M. T., Eisenberg, M., & Scheffer, C. (2010). International team approach to Project-Oriented Problem-Based Learning in design. *World Transactions for Engineering Technology Education*, 8(2), 137-144.
- Vygotsky, L.S. (1978). *Mind in Society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Wiek, A., Xiong, A., Brundiers, K., & van der Leeuw, S. (2014). Integrating problem-and project-based learning into sustainability programs: A case study on the School of Sustainability at Arizona State University. *International Journal of Sustainability in Higher Education*, 15(4), 431-449.
- Yasin, R. M., Mustapha, R., & Zaharim, A. (2009). Promoting creativity through problem oriented project based learning in engineering education at Malaysian polytechnics: Issues and challenges. In *Proceedings of the 8th WSEAS International Conference on Education and Educational Technology*, pp. 253-258.
- Yasin, R.M., Rahman, S., Jusoff, K., Mohd Yunus, M. & Minghat, A.D. (2011). Harnessing Technological-Creativity for Economic Development: A Problem-Oriented Project-Based Learning Approach. *World Applied Sciences Journal*, 13(4), 638-644.
- Yusoff, S., Ng, C. G., Keng, Z. X., & Mohamad, Z. J. (2011). Integrating sustainability in engineering curriculum through incorporation of problem-oriented project-based learning (POPBL) learning strategy. In *International Engineering Education Conference, Madinah al-Munawarah, Kingdom of Saudi Arabia*.