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Chapter 28

THE IMPLEMENTATION OF PROJECT-BASED LEARNING TO FOSTER 21ST CENTURY SKILLS AMONG MALAYSIAN POLYTECHNIC ENGINEERING STUDENTS

*S. Thivviyah Sanmugam**
General Studies Department, Banting Polytechnic Selangor,
Persiaran Ilmu, Jalan Sultan Abdul Samad,
Banting, Selangor, Malaysia

ABSTRACT

The growing importance placed on excellent 21st century skills by employers has been echoed internationally. Although knowledge and technical know-how are clearly important, but these requires to be presented with excellence. Professional 21st century skills reflect positive impression of the engineer. However, the lack of these crucial skills among engineering graduates has been widely reported in the literature. The role of developing professional and proficient graduates are often

* Corresponding Author's E-mail: thivviyahs@gmail.com.

shouldered by the English language lecturers. They need to play a proactive role by constantly rethink and make progressive changes in the way they carry out their day to day instructional practice. In order to overcome this issue, the study explored engineering students' views on executing project-based learning (PBL) in the form of an eco-friendly innovation challenge project presentation. Sixty-two mechanical and aircraft maintenance engineering students undertaking Communicative English 2 course were required to work in groups to complete the project. Qualitative data were collected using semi-structured interview and reflection writing while the collected data were analyzed using thematic analysis. Results of the study revealed how the eco-friendly innovation challenge project had provided engineering students with new learning experience and improved engineering students professional 21st century skills, namely the 4C's skills; communication, critical thinking, collaboration, and creativity.

Keywords: project-based learning, eco-friendly innovation challenge, 21st century skills

1. Introduction

The attributes of 21st century engineers encompass a wide variety of technical and non-technical skills such as: core engineering knowledge, ICT, collaboration, communication, creativity, critical thinking and media literacy. In order to perform well effectively at the future workplace, engineering graduates need to possess both these critical 21st century skills. According to Wallwork (2015), among the wide range of 21st century skills, the 4Cs skills namely collaboration, creativity, critical thinking and communication skills are the most touted soft skills required of fresh graduates to be competitive and competent in securing and sustaining a job. However, the lack of these crucial skills among engineering graduates has been widely reported in the literature. Among the reasons cited for fresh graduates unpreparedness to enter the workforce are poor English language proficiency and lack of the 4C's namely communication, creativity, critical thinking and collaboration skills (NST Education, June 19, 2019). Specifically, in the Malaysian polytechnic context, a plethora of studies had highlighted many debates evolved on poor soft skills namely;

communication and English language proficiency level of the polytechnic students (Isnin et al. 2019; Ismail, Ahmad and Awang 2017; Sanmugam 2013).

The role of generating proficient graduates is unspokenly shouldered by the English lecturers (Abdullah and Majid 2013). Therefore, English language educators need to take proactive measures to curb the issue. However, it is found that conventional teaching practices are still a customary practice among Malaysian polytechnic lecturers (Sanmugam, Shamsuddin and Gunadevi 2017; Puteh-Behak et al. 2017). In addition, the assessments for Communicative English modules which consists of test, written assignments and presentations are considered conventional. According to Siti Norida Wahab, Salini Devi and Yeap Swee Pin (2020) conventional assessments can be boring, unattractive to Generation Z and are unable to cultivate the practical and life-long learning skills. Similar issues were rampant when it comes to carrying out oral presentation assessments in Communicative English classroom. Students would usually resort to copy and paste culture and lacked the creativity when preparing for their presentation and usually would end up giving a poor and boring presentation. As a result, they would score very poorly for their oral presentation assessment.

Thus, in order to address the issues related to students' lack of vital soft skills for future workplace and issues related to conventional teaching methods and assessments, an interesting project-based learning assessment learning in the form of an eco-friendly innovation challenge project was carried out to replace the conventional oral presentation assessment. The new assessment was devised based on the Project based learning (PBL) approach. PBL is able to match the needs of the future workplace as unlike the conventional teaching instructions, PBL focuses on student-centered, engaging and authentic activities. Bell (2010, p. 39) argues project based learning is a teaching and learning approach that gives important strategies for students to success in the 21st century while Sumarni (2015, p. 480) states that PBL can improve students' collaboration, communication, creativity, and problem solving skills. Thus, the aim of the current study is to investigate engineering students' performance and opinions upon the

implementation of the new interesting project-based learning in the form of an eco-friendly innovation challenge project presentation.

2. METHOD

The participants of the study included third semester 62 mechanical and aircraft engineering students registered for Communicative English 2 course at a Malaysian polytechnic for December 2019 academic session. The average age of the students is 19. The main objective of the two credit hour Communicative English 2 course is to expose students to skills related to describing products and services and processes and procedures. In addition, the course also aims to enhance students' skills pertaining to giving and responding to enquiries and complaints. Students are required to complete 4 continuous-assessments for the paper throughout the semester in forms of written test, listening test and presentations. As a requirement of the course, students had to fulfil the oral presentation assessment for the topic of product and services.

The author who is also the English language lecturer implemented a new project based assessment in the form of an eco-friendly innovation challenge to replace the common oral presentation task in which students would usually end up searching and presenting about existing products from the internet. Students would be presenting information that are copied and pasted into their slides and it lacked creativity. Conversely, in the new eco-friendly innovation project challenge, students are required to work collaboratively to come up with an innovative product using recycled materials. As for the presentation assessment, unlike previous mode of using PowerPoint presentation, students are required to present their product/prototype using attractive digital posters in an exhibition to a large group of audience during the polytechnics' annual English Carnival programme. In order to motivate and challenge her students, the English language lecturer incorporated the eco-friendly product innovation challenge as one of the competitions compulsory for all semester 3

students to participate during the English Carnival programme. The English language lecturer further invited lecturers from the engineering department to co-assess and provide feedback in terms of the technical aspects of the product students presented. Thus, while the students took part in exhibiting and presenting their innovative product during the English Carnival programme, they were also assessed concurrently by both their English language lecturer and main department engineering lecturer. In this way, they would be able to obtain conclusive feedback pertaining to both the language/communicative and the technical aspects of the product.

Focus group interview sessions were carried out with each group of students using semi-structured interview questions. In addition, each student was to write a reflection pertaining to their experiences once the assessment was over. Transcripts from the interviews and reflection writing were coded thematically.

3. Results and Discussion

A comparison of student's oral presentation assessment score was carried out. Figure 1 presents the bar graph depicting the comparison.

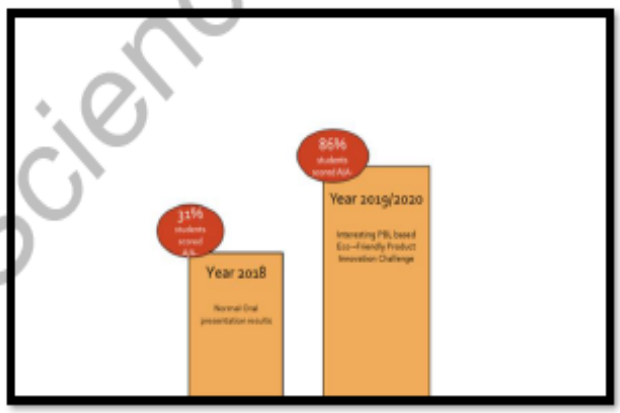

Figure 1. The comparison of student's performance for oral presentation assessment.

It was found that in the year 2018, only 31% of students' who underwent the common oral presentation assessment scored either A or A-. However, with the implementation of the new project-based eco-friendly product innovation challenge, the percentage of students' who scored either A or A- increased up to 86%. Therefore, students scored better grades with the implementation of the new PBL approach.

Next, according to the interview response and students' written reflections, engineering students perceived that their 21st century competencies, namely the 4C's skills were enhanced. In addition, they mentioned that they enjoyed and preferred the new project-based eco-friendly innovation challenge as the assessment format instead of the usual oral presentation assessment. Below are several associated feedback given by the engineering students:

> "This challenge developed our creativity, communication skills and team work to win the challenge" (G2).
>
> "The project has challenged and made us think out of the box and enhanced our creativity and interests in innovation challenges" (G3)!
>
> "The innovation challenge has enhanced our oral presentation skills, team work, innovative and creativity skills in terms of product development. We managed to come up with our own product!" (G5).
>
> "The eco-friendly product challenge was different, interesting and a fun assessment. We learned and enjoyed at the same time" (G8).
>
> "We enjoyed participating in the challenge and would want this kind of interesting assessment to be continued" (G10).

CONCLUSION

The current study explored engineering students' performance and opinions upon the implementation of the new interesting project-based learning in the form of an eco-friendly innovation challenge project presentation. The analysis of students' interview and reflection data revealed the improvement in terms of students' scores for oral presentation

assessment. In addition, the new project-based eco-friendly innovation challenge had developed students' communication, presentation, creativity and team-work spirit. They have also suggested that the implementation of PBL as an instructional and assessment tool should be continued in future.

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