Open Educational Resources (OER) :
Implementation in Graduate Employability Skills Training

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Abstract: In the digital era, information and communication technologies is rapidly changing and consequently influences the conventional teaching and learning method. This need to change parallel with the technologies enhancement. In higher education Institution (HEI), it is really important to capture the learning needs of the students and develop the content by using innovative resources. Observation from the recent situation, the Open Educational Resources (OER) is used for assisting technical learning and skills enhancement program for electrical engineering students. The students can assess the digital educational resources anytime and anywhere outside the campus and supervised by the lecturers through OER platform. From the research conducted, the readiness and acceptance of new teaching & learning method was obtained by conducting a survey with a sample of 14 students and 10 lecturers who involved in this program. The results indicated that there is a correlation between the features of OER and student's skill to handle digital resources. The success and challenges of the OER platform has paved the way for new methods of teaching and learning outside the confinements of traditional learning.

Key words: *Open Educational Resources (OER), Digital Resources, Long Distance Supervision, Skill Enhancement, Teaching & Learning.*

INTRODUCTION

Higher education institutions around the world have been using the Internet and other digital technologies to develop and distribute teaching and learning for decades. When everybody is experiencing a time of constant evolution in the field of education in which students require more resources and tools to obtain the information and construction of knowledge. Recently, Open Educational Resources (OER) have gained increased attention for their potential and promise to obviate demographic, economic, and geographic educational boundaries and to promote life-long learning and personalized learning. The rapid growth of OER provides new opportunities for teaching and learning, at the same time, they challenge established views about teaching and learning practices in higher education.

Lane & Dorp [1] stated that open educational resources are beginning to influence educational opportunities in Europe, but that new policies and practices are required at all levels in the higher education system to address issues of openness and open educational resources in higher education study and the role that they can play in increasing and widening engagement and participation. However, Hylén [2], revealed there are many critical issues surrounding access, quality and costs of information and knowledge over the Internet as well as on provision of content and learning material.

A review of the current literature shows a great number of universities or organizations that have created their own virtual and remote laboratories to support life-long learning and students' autonomous learning activities. However, besides all great benefits, a study in Mtebe & Raisamo [3] investigated challenges that hinder the adoption and use of OER in 11 HEIs in Tanzania. Findings revealed that lack of access to computers and the Internet, low Internet bandwidth, absence of policies, and lack of skills to create and/or use OER are the main barriers to the use of OER in HEIs in Tanzania. Contrary to findings elsewhere in Pena [4]

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where a broader perspective on free information, knowledge and education was discussed.

OER can be defined as "digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning, and research" as state by Mckerlich, Ives, & Mcgreal [5]. Based on the results of a survey developed to measure the readiness of faculty and staff to adopt OER, this paper focuses on the measurement of OER use and creation, and identifies factors to increase both.

Another finding by García et al. [6] reveals that online learning can be suited to either performance or skills acquired by students in engineering program. The main advantage when compared with traditional electronic laboratories lies in its availability that has neither temporal nor geographical restrictions.

In this study, a research model is proposed based on technology acceptance model (TAM) [7], in which the influence of social network is taken into account and provide further understanding to develop strategies that will maximize their usage. Based on the analysis of questionnaire data, some suggestions are put forward. A moodle platform such as OER help the lecturer to assign additional activities for the understanding of the concepts seen before. But there are times when the student does not understand the content because of the form it represents, making it necessary to have more options to facilitate the understanding of content through different ways that may be more attractive to the students, achieving more active participation in the subject and an affinity that leads to a better learning experience.

The rest of the paper is organized as follows: in section II we describe the methodology used; section III shows some preliminary and testing results obtained and, finally, section IV outlines some conclusions and future work.

METHODOLOGY

This project approach quantitative method that enable us to test the relation between variables and intended to quantify the variation of a phenomenon, situation, problem or issue. Some suggestion from Gamage, Fernando, & Perera [8] revealed that the information or data is obtained through predominantly quantitative

variables and the results is oriented to access the variation amplitude.

A set of questionnaire is used as the tool for data collections and developed by the authors. It composed of closed ended questions. Students and lecturers fill up the questionnaire after using this OER platform for 3 months. The results obtained from this survey was analyzed and presents in the next section. The participants were from the students and lecturers who involved in graduate employability skills training program for semiconductor industry.
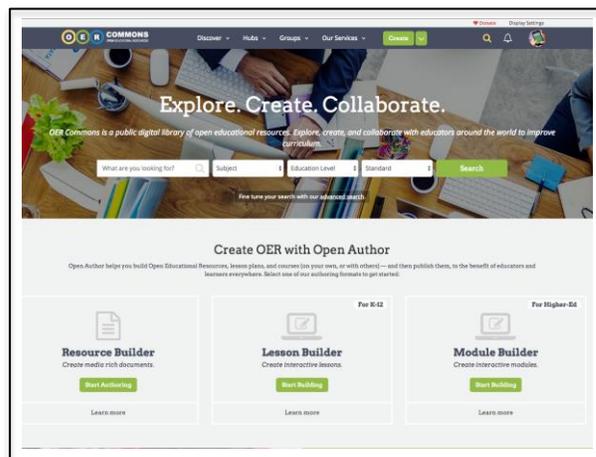

Figure 1: OER Platform

OER is based on the idea that knowledge should be disseminated and shared freely through the Internet for the benefit of society as a whole. Figure 1 represent the front page of OER platform. It can be seen that the most important aspect of OER is free availability where everybody can access and make use of it. The users experience a few restrictions as possible on the use of the resources. The materials published in the OER platform may be used in their own teaching (e.g. syllabi, lecture notes, reading lists etc.), to projects that support the creation, provision and sharing of open content through developing software, standards and licensing tools or building communities of use among the other educators, institutions and industries.

The data obtained is non-probabilistic, voluntary or convenience. The selection method of a voluntary or of a convenience participants considering the availability and accessibility of the population elements that it integrates, and the data of this study is composed of units which are accessible to the researchers and who voluntarily offered to integrate it.
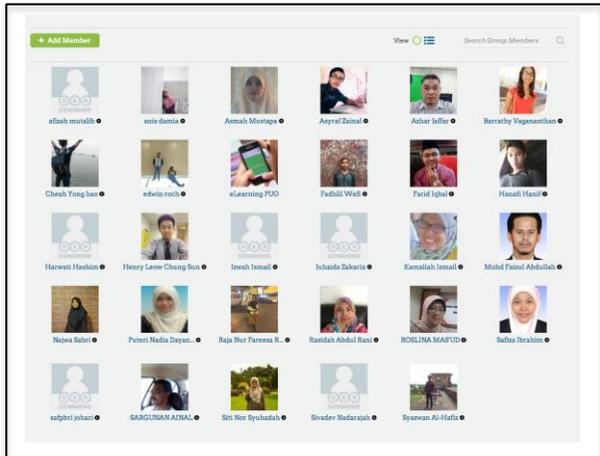
Figure 2: Participants

Figure 2 depicted the participant's profile who actively publish and sharing information in the OER platform for respective thread. Consequently, OER represent an important way to enrich those strategies that should essentially meet students' needs and interests. The appropriate use of OER in higher education can widen access, reduce the costs, and improve the quality of education. The quality of education is improved when instructors and learners can easily access resources.

The participants were selected during the December 2017 session and they were the students of the institution who undergo the internship program with one of the nearby semiconductor company. Students came from different program in Electrical Engineering department. In the year mentioned, there were 13 students enrolled for this program which corresponds to approximately 100% of the population. Among the sample elements, 8 (61.5%) are male and 5 (38.5%) are female. The mean age is 20.8 years old, the mode and the median are 21 years old and the standard deviation is 2.7.

RESULT AND DISCUSSION

Preliminary

The design and planning of OER resources were discussed earlier before the development process. Types of material /resources prepared by the lecturers are lesson, case study, report, assignment and discussion as presented in Figure 3. All these types of material were provided for 4 modules listed as follows:

- Module 1: Tooling
- Module 2: Soft skills
- Module 3: System Control (Electronics)
- Module 4: System Control (Logical Sensor)
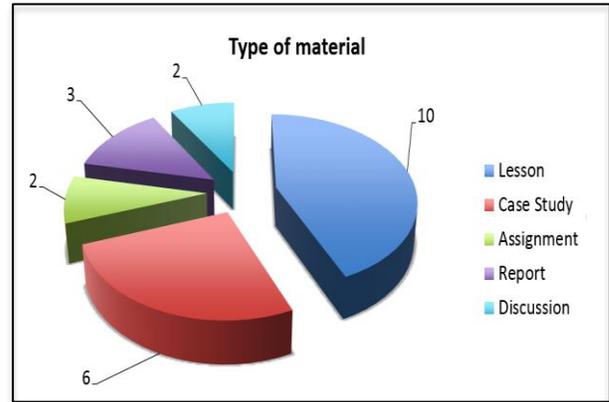- Module 5 : IC Packaging Technology

Figure 3 : Type of Material in OER

Testing

The activities on OER platform were monitored in 3 months' time starting from December 2017 until February 2018. Participants were lecturers and students.

From figure 4, the data showed that lecturers preferred to upload the notes and exercise questions for the students at one time but regularly online for giving feedback and interactive session with students.
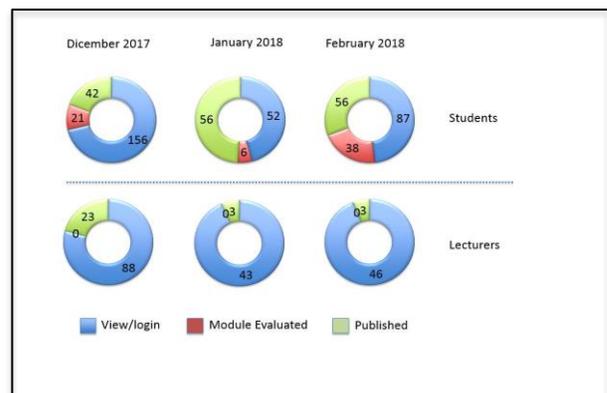

Figure 4 : Analysis of OER activities

From the questionnaire distributed to the students among the participants, figure 5 depicted that they had faced some difficulties for module 3 : System Control. This module were based on the real problems in the factory and types of machines used in the industry.
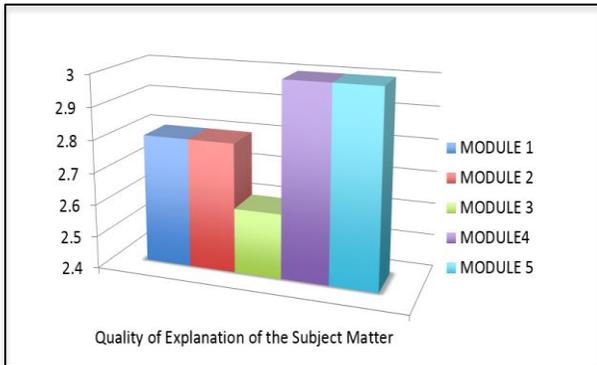
Figure 5 : Quality of Explanation of the Subject Matter Expert (SME)

Figure 6 represents the utility of material designed to support teaching. As all the types of material in OER were fully utilised, each modules showed great contribution.
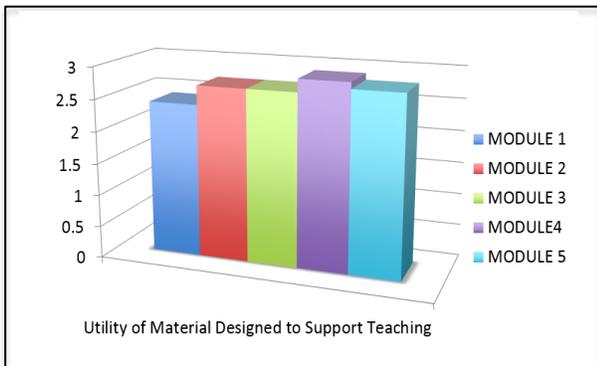

Figure 6 : Utility of Material Designed to Support Teaching

Considering the present situation as well as the importance given to OER and to the role these may play in supporting learning, assess the digital educational resources features most valued by higher education students; verify the extent to which students' IT knowledge influences their ability to explore and assess the digital educational resources; identify the knowledge that higher education students have of OER and how they can fully utilized the material inside the OER platform.
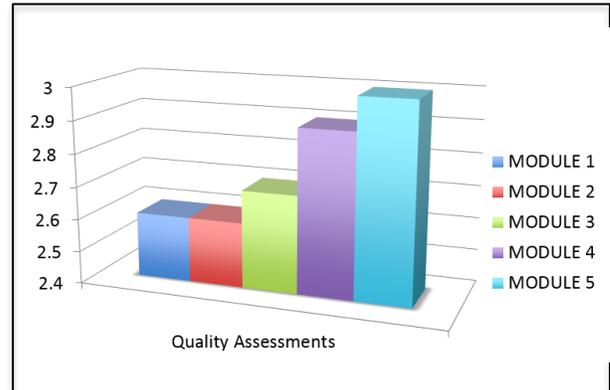

Figure 7 : Quality of Assessments

Figure 7 showed the quality of assessment provided in OER. Module 1, 2 and 3 involved fully hands on and face to face sessions. The assessment also done partially online and off line.
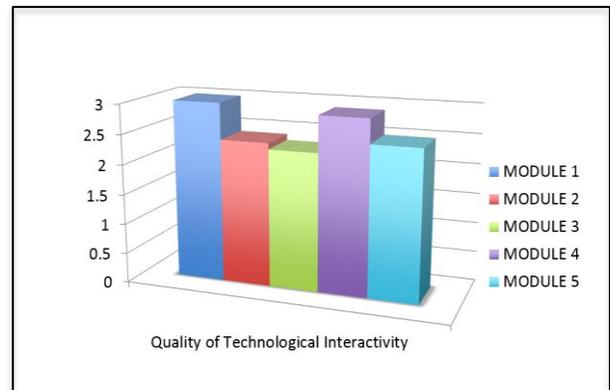

Figure 8 : Quality of Technological Interactivity

Quality of Technological Interactivity depicted highest score as in figure 8. It can been seen that all modules got higher score. OER provides an interactive platform and also friendly user interface.
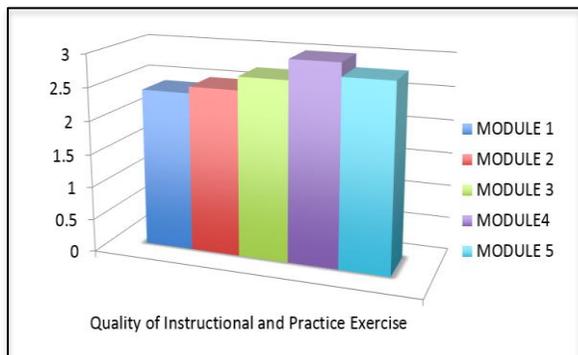

Figure 9 : Quality of Instructional and Practice Exercise

As OER offered an interactive platform , Instructional and Practice Exercise as in figure 9 also shows score from 2.4 to 3.0. Its different with figure 10 where the opportunities for deeper learning for module 2 shows lowest score when compared to other modules. Module 2 is softskills module for technical students. Its quite important as they also need to have good communication skills and report writing not only good technical skills. The work ethic, attitude, communication skills, emotional intelligence and a whole host of other personal attributes are the soft skills that are crucial for career success and development. Time allocated for this module not enough to monitored the individual development but from this the basic of softskills already implemented. For technical modules, the students had the opportunities for deeper learning as a number of interactive resources were published and prepared by the lecturers.
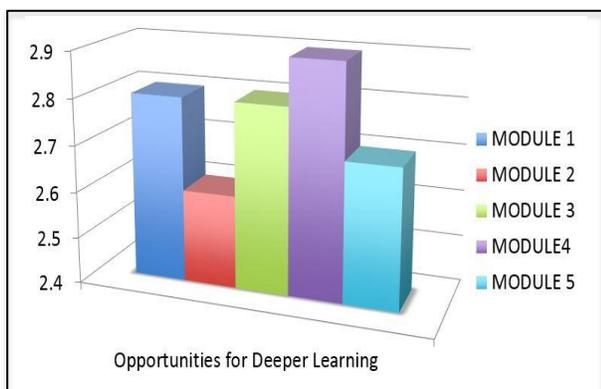

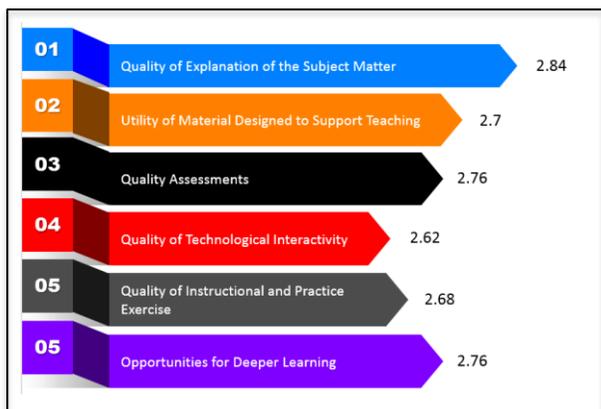Figure 10 : Opportunities for Deeper Learning

Figure 11 : Average of Module Evaluation

Based on 5 criteria's as shown in figure 11, the highest average is 2.84 for quality of explanation from subject matter expert. Lecturers were encouraged to published video on technical skills related with the module.

Second highest average of module evaluation were shared between quality of assessment and opportunities for deeper learning with score 2.76. Quality of assessment is one of the vital criteria to ensure level of students understanding for certain topics. Quality outcomes from technical vocational education and training (TVET) are fundamental to ensuring a skilled workforce and supporting a productive economy. In a competency-based training system, assessment is the gatekeeper for quality. Meanwhile, opportunities for students to acquire deeper learning skills and how these opportunities are related to student outcomes also an important factor to be considered.

The collected data can be extremely valuable in order to provide useful information to improve the design and delivery of online courses, customize the learning experience, adjust learning times according to profiling, make a better use of limited human resources and detect loss of interest and potential drop-outs before they occur.

CONCLUSION

Open Educational Resources (OER) is proved to be one of the technological teaching & learning platform that has taken higher education to a new level. Despite the popularity as free and open resources, the digital knowledge among the users and internet network facilities are also important before a successful OER platform can exist in any institution.

From the pedagogical point of view, to use OER for giving a better service to participants, some improvements had been implemented in order to obtain the information in an easier way and to include all the parameters and indicators to help lecturers' analysis. Our OER platform is developed prior exploring many different learning analytics aspects for technical skills training. As for future works, we will be enhancing the OER platform by including the simulation and project design with a set of practices for doing real practices on semiconductor industry.

ACKNOWLEDGMENTS

REFERENCES

[1] Lane, A., & Dorp, K. J. Van. (2012). Innovations and Lessons from Open Universities. In *Open Educational Resources and Widening Participant in Higher Education* (pp. 1–10).

[2] Hylén, J. (2002). *Open Educational Resources : Opportunities and Challenges*.

[3] Mtebe, J. S., & Raisamo, R. (2014). Investigating Perceived Barriers to the Use of Open Educational Resources in Higher Education in Tanzania. *The International Review of Research in Open and Distance Learning*, *15*(2), 44–66.

[4] Pena, H. R. (2010). *HIGHER EDUCATION: The Success and Challenges in Open Education Resources (OER)*.

[5] Mckerlich, R., Ives, C., & Mcgreal, R. (2013). Measuring Use and Creation of Open Educational Resources in Higher Education. *The International Review of Research in Open and Distance Learning*, *14*(OCTOBER), 91–103.

[6] García, F., Díaz, G., Tawfik, M., Martín, S., Sancristobal, E., & Castro, M. (2014). A practice-based MOOC for learning electronics. *IEEE Global Engineering Education Conference, EDUCON*, (April), 969–974. https://doi.org/10.1109/EDUCON.2014.6826217

[7] Ashok, D. (2016). Technology Readiness and Acceptance In Teaching -Learning Process – A Conceptual Framwork. *International Journal of Applied Business and Economic Reasearch (IJABER)*, *14*(4), 2403–2412.

[8] Gamage, D., Fernando, S., & Perera, I. (2015). Factors leading to an effective MOOC from participiants perspective. *2015 8th International Conference on Ubi-Media Computing, UMEDIA 2015 - Conference Proceeedings*, 230–235. https://doi.org/10.1109/UMEDIA.2015.7297460