The Online Student Portfolio Implementation at the Faculty of Civil Engineering, Universiti Teknologi MARA, Pulau Pinang Malaysia

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ABSTRACT

A student learning portfolio is a documentation of student work that exhibits a student's effort, learning progress, achievements, and competencies gained during a course or time in university. However, compiling a hardcopy student learning portfolio requires excessive physical resources and space. Therefore, an innovative, creative and economical solution is needed for quality student service. Hence the Faculty of Civil Engineering, Universiti Teknologi MARA, Pulau Pinang, has developed an initiative to implement an online student learning portfolio using the Google Sites online platform. This paper has two main objectives. Firstly, to describe the documentation processes of the online student portfolio implementation, which comprises the students' learning reflection, the cumulative Program Outcomes, (PO) attainment, and the progressive learning performance. Secondly, to evaluate the effectiveness of the implementation of the student learning portfolio using an online platform. 863 students participated and successfully produced the online learning portfolio. The output and

feedback received from the participants show that the implementation of the online student portfolio is highly beneficial and effective for both the students and the Faculty management, especially during a pandemic like COVID-19, where an economical solution is required, and the availability of documentation online can be accessed remotely.

INTRODUCTION

Student Portfolio was introduced in the 1990s using electronic medium, and it continues to evolve as one of the critical reflections of student reflection in their learning (Weber, 2018). The transformation from hardcopy to intermate-based versions has opened up a vast opportunity for an academician to utilize this platform to assess student reflection fully. Barret (2007) highlighted that a compilation of student e-portfolio for higher education should comprise students' work in collecting, storing, reflecting, and presenting their academic and professional experiences as undergraduate students. This is strongly supported by other researchers (Kok and Blignaut 2008; Bhattacharya and Hartnett 2007; Parker, Ndoye and Ritzhaupt 2012) where the migration of conventional compilation of student portfolio to electronic medium has shown be able to strengthen academic education.

Previous studies have proven that a student learning portfolio is an effective tool in assessing students' reflection and assessment (Jafari & Kauman, 2006; Cambridge, 2010; Light, Chen & Ittelson, 2012). It can be an ideal vehicle for student professional development and foster students' learning reflections (Mapundu & Musara, 2019). In assessing complex professional skills, student portfolio is seen as one mechanism that can be adapted within higher education institutions (Flores, Veiga Simao, Barros & Pereira, 2015; Franco et al., 2017; Jaeger & Adair, 2015). A recent study by Lukitasari et al. (2021) revealed that the use of an e-portfolio has shown to be effective in the development of students' metacognitive abilities. Student portfolios, according to Espinel-Rubio et al. (2021), promote the development of skills such as learning capacity, autonomy and personal initiative, creativity, reflection and critical thinking, and communication and

digital capabilities. Furthermore, it can assist a student in being student-centred in reflecting on education practices and acquire complex learning outcomes (Davis, Ponnamperuma & Jer, 2009; McDonald, 2012; Flores et al., 2015) as well as help the Faculty fulfil engineering accreditation requirements. A study conducted by Taylor et al. (2019) has proven that student e-portfolio is one of the best practices in supporting project-based learning within engineering higher education programs.

Phothongsunan (2020) gathered students' responses on the implementation of student portfolios and revealed that while students recognise the benefits, they also believe it comes with more obligations and responsibilities in terms of the preparation. However, according to a student interview session done by Muho, A., and Leka, K. (2021), regardless of the additional effort required to prepare the student portfolio, it motivates them to learn more. Therefore, the establishment of a student portfolio necessitates careful planning.

Universiti Teknologi MARA (UiTM), Malaysia, is known to be the biggest public university in Malaysia. There are two intakes per year with a minimum enrolment of three hundred students for one program. Therefore, the handling of the student documentation process has remained very challenging. The Faculty of Civil Engineering started to operate in 2004 in UiTM, Pulau Pinang. Nevertheless, the Bachelor of Civil Engineering (Infrastructure) undergraduate program only commenced in the middle of 2011. The program is accredited by the Engineering Accreditation Council (EAC) under the Board of Engineers Malaysia (BEM), one of the signatory board members of the Washington Accord. To maintain the EAC accreditation, the Faculty must design the program curriculum by incorporating the Outcome-Based Education (OBE) approach. One of the elements required by the accreditation body is for the Faculty to provide evidence of student learning reflections on Program Outcomes attainment and ensure the continuous quality improvement processes are in place.

Consequently, students are required to create a learning portfolio to provide the evidence. However, preparing and compiling a hardcopy student learning portfolio is challenging and requires excessive physical resources and space. Therefore, the Faculty of Civil Engineering, Universiti Teknologi MARA, Pulau Pinang, has developed an innovative, creative and economical solution by implementing an online student learning portfolio

using the Google Sites online platform. The online student portfolio is developed to capture and document the students' work that exhibits their effort, progress, achievements, competencies, and any Faculty intervention activities gained during their study time in the university.

The online student portfolio developed by the Faculty of Civil Engineering, UiTM Pulau Pinang, is a document compiling the learning reflections of students based on the pre-described Program Outcomes (PO) and subsequently the Program Educational Outcomes (PEO). This project provides evidence of the students' learning reflection throughout their study at an individual level. Developing an online student learning portfolio is favourable as students of this era prefer electronic documentation compared to hardcopy documentation. The student learning portfolio is also a medium to provide all the information required by the students to develop their curriculum vitae.

There are two main objectives discussed in this paper. The first objective is to describe the documentation processes of the online student portfolio implementation, which comprises the students' learning reflection, the cumulative Program Outcomes, (PO) attainment, and the progressive learning performance throughout their study for the EC221 program at Universiti Teknologi MARA, Pulau Pinang. The second objective is, to evaluate the effectiveness of the implementation of the student learning portfolio. The effectiveness of the online learning portfolio was evaluated through feedback obtained from students who participated in preparing the online learning portfolio at the Faculty of Civil Engineering, Universiti Teknologi MARA, Pulau Pinang. This is one of the quality initiatives to serve the students better.

METHODOLOGY

The implementation process of the online method was initiated by designing the interface and the content portfolio development. Google Sites was used as the platform for the implementation of the student learning portfolio. The interface and content of the portfolio were decided based on the required continuous quality improvement components. It was designed for students to compile all the critical milestones and learning portfolios and necessary supporting documents, including their resumes. A research model was developed as shown in Figure 1 below.

Figure 1
Research Model
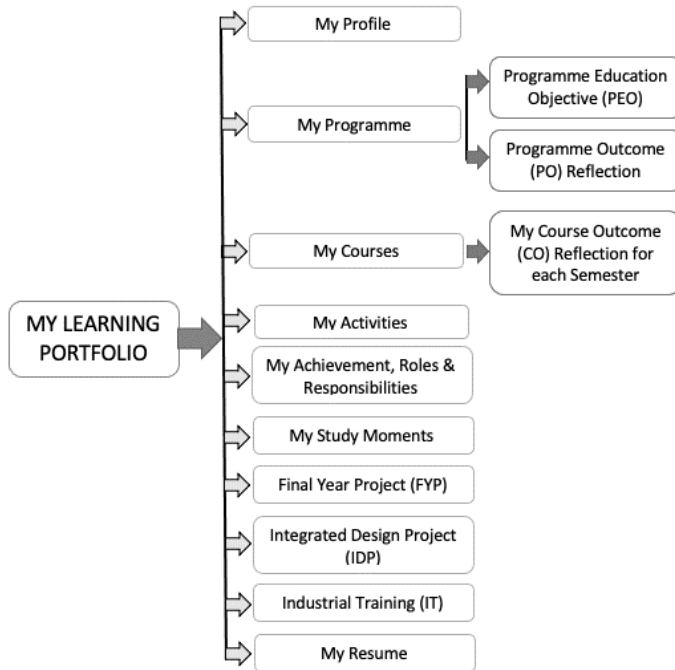
863 students from different cohorts participated in producing the online portfolio with guidance from their respective academic advisors. The participants included a cohort from the first accreditation cycle (2010 to 2016). Feedback from all the participants were then collected and analyzed to determine the effectiveness of the online student portfolio implementation.

Student Learning Portfolio Implementation Processes

The implementation of student portfolios was carried out using the Google Sites platform, which is freely available. The Faculty pre-designed a specific template of the portfolio and made it available in the Google Sites platform. There are several elements included in the portfolio to create important and interesting portfolio content. Every participating student was then guided by their academic advisor to download the template and develop their learning portfolio.

Table 1
Student Portfolio Elements

Student Portfolio Elements	Decription
1. My Profile	This section provides an opportunity for students to write his/her background.
2. My Program	This section provides an opportunity for students to be aware of his/her Programme Eductational Objectives (PEO) and Program Outcome (PO). Reflection of students' PO attainment in each semester is captured.
3. My Courses	This section provides an appourtunity for students to reflect on their achievements for each course taken every semester.
4. My Activities	This section provides an opportunity for students to reflect on their involvement in any curricular activities throughout their study years.
5. My Acievement, Roles & Responsibility	This section provides an opportunity for students to reflect on their achievements, roles, and responsibilities throughout their study years.
6. My Study Moments	This section provides an oppourtunity for students to share any memories throughout their study years.
7. My Learning Reflection	This section provides an oppourtunity for students to write their learning reflections for every semester.
8. My Final Year Project (FYP)	This section provides an oppourtunity for students to compile all works and activities related to their final year project dissertation.
9. My Industrial Training	This section provides an oppourtunity for students to compile all works and activities related to their 10 weeks industrial training attachement.
10. Integrated Design Project (IDP)	This section provides an oppourtunity for students for students to compile all works and activities related to their integrated design project (IDP).
11. My Resume	This section provides an oppourtunity for students for students to prepare their resume which is required for their interview.

Table 1 shows the details of the portfolio contents. There are eleven main elements to be incorporated into the student portfolio. The first element is the student's details, where students are encouraged to describe their background creatively. The second and third elements are the detailed Program Outcomes and the list of courses based on the semester specified in the program curriculum structure. Students could update their PO attainment and their progressive grades achievement. Elements four to seven require students to write their activities, extra-curricular activities and responsibilities, record their study moments, and reflect on their learning. Consistent and systematic reflection increases students' learning as it supports growth mindsets and encourages them to learn from their past mistakes. Elements eight to ten comprise the cumulative or the capstone courses. On this page, students get to document all the activities and learning reflection in the Final Year Project, the Industrial attachments, and the Integrated Design Project. Finally, students get to develop and improve their Curriculum Vitae progressively in element eleven.

The Effectiveness of the Online Student Portfolio

A questionnaire was designed to evaluate and capture student feedback on the effectiveness of implementing the online student portfolio. There are a total of six questions from two sections provided in the questionnaire. The question in the first section, assesses the respondents' overall opinion on the benefit of the student learning portfolio. There are five questions in the second section. The first and second questions evaluate the effectiveness of the online learning portfolio to monitor and improve the students' Program Outcome attainment, and improving their English language proficiency respectively. The third and fourth questions elicit feedback on respondents' thoughts and perceptions regarding the effectiveness of the portfolio in preparing their resume and how it helps to increase their employability upon graduation. Finally, the fifth question is about the students' perception of whether the portfolio helps to document their study moments and activities. Respondents' feedback was collected, analyzed and taken into consideration for continuous improvement of the student portfolio implementation processes.

RESULTS AND DISCUSSION

After successful implementation of the student learning portfolio, a few random samples of student learning portfolios from students' Google Sites account are presented. The portfolios were prepared according to the pre-designed interface at the respective students' Google Sites account.

The analyses from the feedback obtained from the survey to evaluate the effectiveness of the student learning portfolio as a reflection of students' learning are presented. In general, encouraging and positive students' feedback was obtained from different cohorts.

Samples of the Student Learning Portfolio

Figure 2 shows samples of the 'My Profile' and the 'My Program' element. Each element of the student portfolio interface comes with a description of the contents. This description provides beneficial guidance to ease the effort of students in preparing the content of their portfolios. The list of courses for the program is also provided. In this interface, students record the grade attained for all courses throughout the eight (8) semesters of their studies. Besides the grade attainment, the cumulative Program Outcomes (PO) are also recorded.

Figure 2
Sample of 'My Profile' and the 'My Program' Element

In addition, the online student portfolio also provides a platform for academic advisors to monitor the progress of their advisees' academic performance through an online medium that is accessible anytime and anywhere. The student reflections through the student portfolio could provide direct input to the program's continuous quality improvement.

A future employer will see all student activities undertaken throughout their study, which reflect the student's psychomotor and affective skills providing an added value to their degree.

Figure 3 shows samples of 'My Study' moment element. These student study moments were captured during the geotechnical engineering laboratory sessions, reflecting students' hands-on experiences in facilitating their learning process.

Figure 3
Samples of the 'My Study' Moment

The Effectiveness of the Student Learning Portfolio

This project has significantly contributed to the documentation of all the accreditation requirements in the student learning portfolio for individual students. The students' feedback on the question in the first section, which is the respondent's overall opinion on the benefit of the student learning portfolio, are shown in Figure 4. From a total of 863 respondents, 92% agreed that the student learning portfolio was beneficial. Meanwhile, a tiny percentage of the respondents believed that the student learning portfolio was 'not beneficial' (3.8%), 'troublesome' (3.4%), and somehow 'time wasting' (0.8%). Some intervention initiatives from the respective academic advisor will be required to motivate these group of students.

The students' feedback on the survey questions in section two are presented in Figure 5. The results show that 96% of the respondents agreed that the student portfolio effectively monitored and helped them plan to improve their PO attainment progressively. Meanwhile, 88% of the respondents agreed that their English language command and writing skills

improved while developing the learning portfolio through the progressive guidance from their respective academic advisors. In addition, 96.1% of the respondents were confident that having the online learning portfolio would increase their employability. Moreover, 93.1% of respondents agreed that the online student learning portfolio effectively recorded all their study activities, important milestones, and achievements. Finally, 96.3% of respondents indicated that the online student learning portfolio would help them prepare a good curriculum vitae.

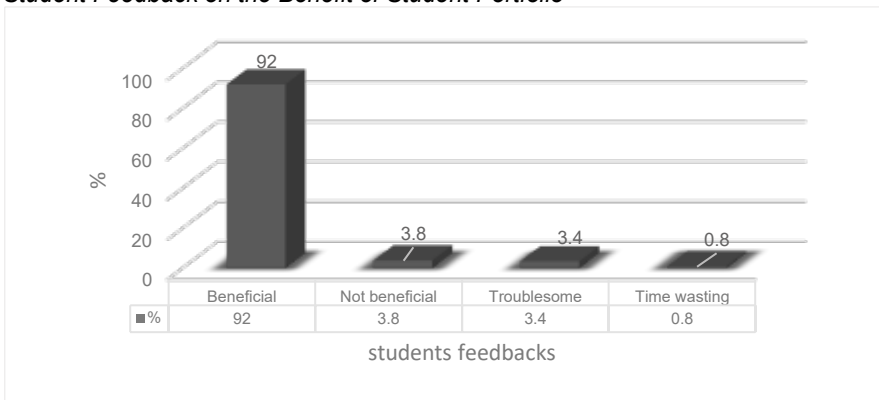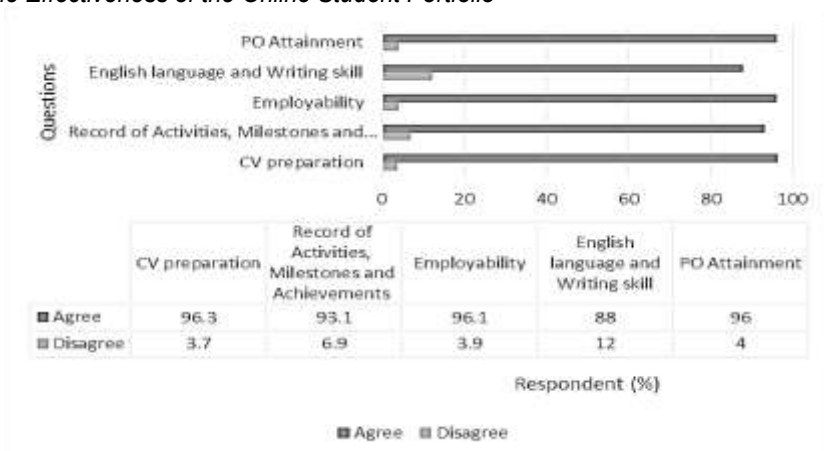**Figure 4**
Student Feedback on the Benefit of Student Portfolio

	Beneficial	Not beneficial	Troublesome	Time wasting
■%	92	3.8	3.4	0.8

Figure 5
The Effectiveness of the Online Student Portfolio

	CV preparation	Record of Activities, Milestones and Achievements	Employability	English language and Writing skill	PO Attainment
■ Agree	96.3	93.1	96.1	88	96
■ Disagree	3.7	6.9	3.9	12	4

Respondent (%)

■Agree ■ Disagree

CONCLUSION AND RECOMMENDATION

This project enabled students to produce via Google Sites, their learning portfolio throughout their study for the EC221 program at Universiti Teknologi MARA Pulau Pinang. The online student learning portfolio provided a platform for academic advisors to monitor the progress of their advisees' academic performance through the freely available online medium that is accessible anytime and anywhere. Supervision and monitoring of students became more fun and effective for both students and academic advisors. Students successfully compiled the documentation on student learning reflections for every course, curricular activities, and soft skill development activities. Being an accredited program by Engineering Accreditation Council (EAC) Malaysia, capturing students' learning reflection is necessary. The student reflection through the student portfolio would contribute to the continuous quality improvement of the program offered. In a nutshell, the student learning portfolio served as evidence needed to fullfill the requirement by EAC that focused on accessibility and compilation of the portfolio and will be reviewed during the accreditation visit. The portfolio also comprised students' performance by providing a larger context which gave insights into students' strengths and weaknesses. Coupled with appropriate incentives, the portfolio also acted as a tool to motivate students to learn better, lecturers to teach better thus, leading to a more efficient process in teaching and learning. From the survey analysis of 863 respondents, it can be concluded that implementing the student learning portfolio is very beneficial and effective. The majority of the respondents agreed that the student learning portfolio effectively monitored their PO attainment, improved their English language command and writing skills, and systematically kept the records of all their study activities, important milestones, and achievements. Having the online learning portfolio also helped them prepare a good curriculum vitae, thus boosting their confidence of their employability. However, some challenges encountered during the early implementation of the online student portfolio will need further attention in the future, such as getting the involvement and total commitment from all the students and their respective academic advisors. A series of motivational sessions to justify the objective of the program needs to be conducted. This is to emphasise the significance of the student learning portfolio that could affect the accreditation outcomes. These also include the interventions from all the academic advisors which are crucial in ensuring the successful implementation and continual improvement of the student-

oriented service system in the future. Further study is suggested to substantiate the possible reasons and find solutions for the students who are not in favour of preparing the learning portfolio.

CONTRIBUTIONS OF AUTHORS

The authors confirm the equal contribution in each part of this work. All authors reviewed and approved the final version of this work.

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CONFLICT OF INTERESTS

All authors declare that they have no conflicts of interest.

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