Assessment Management Practices in Outcome-Based Education in Politeknik Sultan Mizan Zainal Abidin

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Abstract

Assessment management in teaching and learning is one of the essential elements of Outcome-Based Education (OBE). This study aims to identify the assessment management practices among lecturers at Sultan Mizan Zainal Abidin Polytechnic (PSMZA), with a focus on the differences between engineering and non-engineering departments. The research method employed in this study is descriptive research, utilizing a questionnaire, and involving 111 lecturers at PSMZA as respondents. The data collected were analyzed using the Statistical Package for Social Sciences (SPSS). The study's findings indicate that the level of assessment management practices in teaching and learning at PSMZA is high, with a minimum average score of 4.33. The results of the t-test show that there is no significant difference in the level of assessment management practices between the engineering and non-engineering departments. Furthermore, Pearson correlation analysis also reveals no significant positive relationship between the level of assessment management practices in both departments. The study's results indicate that the implementation of assessment management in teaching and learning at PSMZA is at a high level and is practiced consistently across all departments, regardless of whether they are in the field of engineering or non-engineering

Keywords: Assessment; Engineering; Management, OBE, PSMZA.

1.0 Introduction

In Outcome-Based Education (OBE), the entire teaching and learning process is designed to achieve predetermined educational outcomes. The primary goal of OBE is to ensure that students achieve a minimum level of knowledge and abilities that enable them to solve authentic problems in a workplace situation (Midraj, 2018). The implementation of OBE requires effective assessment tools and a modified control strategy to ensure the desired learning outcomes. Effective OBE also emphasizes continuous improvement, where assessment data is used to identify areas for enhancement and inform updates to the curriculum and teaching methods. This cyclical process helps ensure the program remains relevant and effective in preparing students for their future careers (Wang et al., 2024; Mehsen et al., 2020). OBE management involves coordinating curriculum, teaching and assessment to the desired learning outcomes. This requires regular review and adjustment of curriculum,

teaching strategies and assessment practices to ensure they effectively support student learning. Flexible and real-time feedback mechanisms are essential to monitor student progress and make timely interventions (Wang et al., 2024; Mehsen et al., 2020).

Assessment and management practices are important in outcome-based education (OBE) to ensure students achieve the desired learning outcomes. In OBE, assessment, in this context, refers to the process of evaluating student achievements within an educational institution to measure their progress (Popham, 2018). This involves using a variety of assessment methods, both formative and summative, to provide feedback and assess student progress. Formative assessments, such as quizzes and in-class activities, help students identify areas for improvement, while summative assessments, such as exams and projects, measure the final achievement of learning outcomes (Kaderbay et al., 2018; Wang et al., 2024). Assessment management practices in OBE involve creating and implementation of assessments that evaluate student performance in accordance with predetermined learning outcomes. Effective assessment management procedures are important in OBE as they assist in the development of appropriate learning strategies, provision of constructive feedback, assurance of thorough understanding of the subject and tracking of student progress towards achieving targeted learning outcomes (Maureen, 2014).

Recent research emphasizes several important practices in evaluation management in the context of OBE. First, alignment with learning outcomes is fundamental. According to Jones and Palmer (2020), assessment must be designed in a way that clearly reflects the expected competencies and skills outlined in the educational objectives. This alignment ensures that assessments accurately measure whether students have achieved the desired learning outcomes. Additionally, diversity in assessment methods is increasingly recognized as beneficial in the implementation of OBE. Smith et al. (2021) argue that using different types of assessment, such as formative assessment during the learning process and summative assessment on key points, provides a more comprehensive understanding of student progress and achievement. This approach not only supports continuous feedback to students but also allows educators to adapt teaching strategies effectively.

The implementation of effective assessment management practices plays a pivotal role in making outcome-based learning more effective. It stands as a dominant component of the teaching and learning process conducted in educational organizations comprehensively. The assessment process encompasses several crucial aspects, as highlighted by Yuh (2020). These assessments primarily emphasize performance-based criteria, centering on the practical application of knowledge and skills rather than solely focusing on theoretical understanding. It aids in designing appropriate learning strategies, providing constructive feedback, ensuring deep understanding, and tracking students' progress towards achieving desired learning outcomes.

Each of these components contributes to the overall effectiveness of the assessment process, ultimately guiding educators in tailoring their instructional approaches to align with outcome-based learning objectives. In essence, effective assessment management practices not only support the implementation of outcome-based learning but also enhance the quality of education by ensuring that assessments are well-designed, meaningful, and serve as valuable tools for student development and achievement.

Furthermore, assessment management involves the communication of assessment reports to students, parents, and institusion. These reports provide an overview of student achievements and their progress in specific aspects. Brown and Johnson (2019) emphasize providing timely and constructive feedback to improve student learning outcomes. Effective feedback empowers students to recognize their strengths and areas for improvement, fostering self-regulated learning and continuous progress. They also offer guidance for institutions to design strategies or next steps in teaching aimed at enhancing student learning and mastery levels. In line with this, a report from Malaysia in 2009 underscores the importance of assessment data in educational management. The report emphasizes that assessment data is instrumental in shaping instructional strategies and enhancing the learning experience for students.

The concept of Outcome Based Education (OBE) is important to manage assessment effectively in the polytechnic system in Malaysia to ensure that the desired learning outcomes are achieved. OBE helps polytechnics determine the specific learning outcomes that students need to master in each program. Once these learning outcomes are identified, assessments are designed based on them. Lecturers and educators at polytechnics create appropriate questions and assessment instruments to measure student achievement in the required competencies and skills. Rubrics or evaluation criteria are used to provide clear guidance in evaluating student achievement. Both formative and summative assessment approaches are used to provide continuous feedback to students and to assess their final achievement (Stiggins, 2006). Assessment data is effectively employed to design subsequent learning actions. Assessment results are communicated to students, parents, and other stakeholders to provide an overview of students' achievements in reaching the desired learning outcomes. By incorporating the OBE concept into assessment management, polytechnics can enhance student learning and ensure the alignment of competencies and skills with industry requirements. This approach ultimately helps in producing graduates who are well-prepared for the workforce and capable of meeting the demands of various industries.

Additionally, the field of expertise of faculty members, whether in engineering or non-engineering disciplines, plays a vital role in the management of assessment in outcome-based education within Malaysian polytechnics (Tajul Ariffin, 2018). This is because the effectiveness of the courses taught is a

crucial factor for faculty members. Competent faculty members who possess expertise in either engineering or non-engineering fields can provide accurate and relevant knowledge to students. They understand the issues and requirements related to the courses they teach and can design and implement assessments that align with the desired competencies and skills. In engineering education, OBE places a strong emphasis on technical skills and competencies necessary for professional practice.

The implementation of Outcome-Based Education (OBE) differs significantly between engineering and non-engineering disciplines due to their distinct educational objectives and professional requirements. In engineering disciplines, OBE focuses on mastering technical competencies essential for professional practice. Assessment practices often include project-based learning, technical exams, and simulations to evaluate students' ability to apply engineering principles to real-world challenges (Abdullah et al., 2022; Ibrahim & Jaafar, 2020). The assessment is created to evaluate students' capacity to apply engineering principles to real-life situations, nurturing skills in problem-solving, collaboration, and creativity. Under the OBE framework, engineering programs strive to precisely match student learning objectives with industry needs, ensuring graduates are qualified for technical positions across multiple industries (Salleh et al., 2021).

In contrast, the assessment practices in non-engineering fields within the context of Outcome-Based Education (OBE) prioritize broader competencies and an interdisciplinary approach. Academic studies have underscored that evaluation methods in the humanities, social sciences, and business frequently encompass written tasks, case studies, and presentations (Sadikin & Liliantara, 2021; Santoso et al., 2020). This assessment endeavors to cultivate critical thinking, analytical reasoning, and the practical application of theoretical knowledge to address societal issues. The non-engineering OBE program underscores the amalgamation of knowledge across various disciplines, thereby equipping graduates for a multitude of career pathways and positions that necessitate adaptive and innovative thinking.

In recent literature, there is an emphasis on the evolution of assessment practices in both engineering and non-engineering Outcome-Based Education (OBE) settings. There is a growing emphasis on formative assessment to provide timely feedback and facilitate student learning (Smith et al., 2021). Furthermore, assessments are increasingly designed to align with program learning outcomes and industry standards in order to ensure that graduates possess not only technical expertise but also transferable skills essential for professional success (Salleh et al., 2021). This evolution demonstrates ongoing efforts to enhance educational outcomes and align curricula with global industry needs and changing societal expectations across various disciplines.

This study addresses challenges in the implementation of Outcome-Based Education (OBE) at PSMZA, where inconsistencies in teaching and learning assessment management across departments hinder effective educational practices. The main issues include disparate approaches to assessments among departments, which lack alignment with OBE principles, and a perceived lack of awareness and understanding among management regarding the importance of aligned assessment practices for achieving desired learning outcomes. Additionally, resource constraints such as inadequate training in assessment management contribute to deficiencies in skills necessary for planning, implementing, and managing outcome-based assessments. The research objectives focus on assessing current assessment management practices among lecturers at PSMZA and exploring differences between engineering and non-engineering departments to understand variations in implementation effectiveness.

2.0 Research Methodology

This study was conducted at PSMZA using a research instrument involving a population of 185 lecturers who had attended the Outcome-Based Education (OBE) curriculum interpretation workshop. However, a total of 111 (60%) lecturers from the JKM, JKA, JKE, JTMK, JMSK, and JKA departments responded to the provided questionnaire. The statement issued by Krejcie & Morgan (1970) is an important reference for determining an appropriate sample size for a study. Their study aimed to provide guidance in determining the required sample size to represent a larger population. Cohen (1988) extensively discussed the concept of sample size effects in statistical power analysis. He presented methods and formulas that can be used to determine an appropriate sample size, taking into account the expected sample size effects, sampling error, and the study's significance level. This indicates that a sample size of 111 lecturers is sufficient to conduct this study.

The research method used was a quantitative study through the process of collecting questionnaire data. The collected questionnaire data were analyzed using SPSS version 22.0. Data analysis included descriptive statistics, standard deviation, t-tests, and Pearson correlation to analyze the questionnaire findings in this study. The questionnaire in this study contained questions related to assessment management that was being investigated.The results of a pilot test showed a Cronbach's Alpha reliability coefficient of 0.875, indicating good reliability and acceptance. The significance level of the study was also set to test the research hypotheses. According to Lakens, the author emphasized the importance of setting the significance level in hypothesis testing in social science research (Lakens, (Lakens, 2017)). The common significance level used was $p < .05$ (alpha α). This article explains the use of equivalence testing and emphasizes the importance of considering equivalence alongside significant differences. Understanding and using equivalence testing helps researchers interpret the results comprehensively and strengthen the study's reliability.

3.0 Results and Discussion

3.1 Demographic Analysis

The respondents in this study consisted of lecturers from all four departments at PSMZA, including the four academic departments (JKM, JKA, JTMK, & JKE) and the two academic support departments (JMSK & JPA). From the analysis conducted, it was found that the majority of respondents in this study were female lecturers, accounting for 72 individuals (65%) out of the total of 111 respondents. Lecturers from the engineering department dominated the overall respondent count, with 72 individuals (65%). On the other hand, respondents from the non-engineering departments represented a minority group in the survey, with 39 individuals (35%) participating. The study showed that lecturers from the engineering department were more interested in responding to the questionnaire compared to lecturers from the non-engineering department, as illustrated in table 1.

Table 1: Lecturer Demographics Based on Engineering and Non-Engineering Fields

Field of Lecturers	Frequency	Percentage
Engineering	72	65%
Non-Engineering	39	35%

3.2 Analysis of the Level of Assessment Management Practices Among Lecturers at PSMZA

Assessment management practices in teaching and learning are reflected through six elements of descriptive statistics, as presented in Table 2. In this study, these six assessment management elements were assessed using a scale ranging from 1 to 5, with 5 indicating the highest level. Here are the minimum and standard deviation values for each element of descriptive statistics, as represented by the assessment management elements.

The highest average score given by respondents was for element D1 ("I record each student's grades based on course learning outcomes (CLO) for reference by lecturers and the ETAC/MQA panel") with an average score of 4.3333 and a standard deviation of 1.10645. On the other hand, the lowest average score given by respondents was for dimension D3 ("I ensure that students keep assessed assessment instruments as evidence in each student's portfolio file") with an average score of 3.9009 and a standard deviation of 1.10334.

These findings indicate that the implementation of assessment management elements has been carried out comprehensively and consistently in all evaluated aspects. Overall, the study's results suggest that lecturers at PSMZA have embraced effective assessment management practices, leading to positive outcomes in student learning and achievement. However, this

information does not provide insights into the extent of significance among these elements and does not establish a cause-and-effect relationship between these dimensions and learning outcomes.

Table 2: Minimum Scores and Standard Deviations for Assessment Management Practices Among Lecturers at PSMZA

Assessment Management Elements	**Mean**	**Standard Deviation**	**Interpretation**
D1: "I record the grades of each student based on the course learning outcomes (CLO) for reference by lecturers and the ETAC/MQA panel."	4.3333	1.10645	High
D2: "I report the course learning outcomes (CLO) of each student in the Course Learning Outcomes Review Report (CLORR)."	4.3243	1.08847	High
D3: "I ensure that students retain assessed assessment instruments as evidence in each student's portfolio file."	3.9009	1.10334	High
D4: "I store assessment instruments in the course file/supporting file for reference by lecturers and the ETAC/MQA panel."	4.2252	1.05903	High
D5: "I store grading rubrics in the course file/supporting file for reference by lecturers and the ETAC/MQA panel."	4.2883	1.02147	High
D6: "I store grading schemes in the course file/supporting file for reference by lecturers and the ETAC/MQA panel."	4.2342	1.03533	High

3.3 Analysis of Differences in Assessment Management Implementation Among Lecturers in Engineering and Non-Engineering Departments

Based on the table below, it is found that the average minimum score for assessment management implementation among respondents from the engineering department is 4.095, while for non-engineering, it is 4.444. This indicates that the minimum score for lecturers in the engineering field (min=4.095) is smaller than that of lecturers in the non-engineering field (min=4.444). This implies that the influence of the engineering and non-engineering fields on a lecturer's assessment management is similar.

Furthermore, the provided t-test is an Independent Samples t-test, which compares the means of two unrelated samples (Aron, 2018). The Levene's test is used to assess the equality of variances between the two samples. In this case, the test results show an F-value of 0.582 and a p-value of 0.447. This means that there is no significant difference in variances between lecturers managing assessment, whether in the engineering or non-engineering field.

Subsequently, the t-test is used to examine the equality of means between the two samples, as shown in Table 3. Based on Table 3, the t-value for the comparison of assessment management practices in the engineering and non-engineering fields is t=0.074, and the significance level is p=0.074. This significance level is greater than 0.05 (p<0.05). Therefore, the null hypothesis (H01) is accepted, indicating that there is no significant difference in assessment management practices between the engineering and non-engineering fields.

Table 3: t-Test Results for Lecturers Based on Engineering and Non-Engineering Fields

Field	Mean	Standard Deviation	F-Value	p	t-Value	Significance Level
Engineering	4.095	0.9873	0.582	0.447	-1.806	0.074
Non-Engineering	4.444	0.9469				

3.4 Analysis of the Significance of Assessment Management Implementation Among Lecturers at PSMZA in Engineering and Non-Engineering Departments

Based on Table 4, the Pearson correlation value is 0.170. This value indicates the strength and relationship of assessment management implementation between engineering and non-engineering departments. In this context, the positive Pearson correlation value suggests a weak positive relationship between engineering and non-engineering departments. However, the significance value (p-value) for the Pearson correlation is 0.074. This value signifies the level of significance in the relationship between engineering and non-engineering departments.

In this context, if the p-value is smaller than the set significance level (usually $p < 0.05$), the relationship between engineering and non-engineering departments is considered statistically significant. However, the p-value of 0.074 indicates that there is no statistically significant relationship between the implementation of assessment management in engineering and non-engineering departments. This suggests that the educational background factor does not influence the implementation of assessment management among lecturers at PSMZA.

Table 4: Correlation of Assessment Management Implementation Among Lecturers at PSMZA in Engineering and Non-Engineering Departments

		Engineering and Non-Engineering Departments
Assessment Management	Pearson Correlation	0.170
	Sig. (2-tailed)	0.074

Note:** The correlation is significant at the $p < 0.05$ level (2-tailed).
N = 111

4.0 Conclusion

This descriptive study aimed to review the implementation practices of assessment management among lecturers in both engineering and non-engineering departments at PSMZA. The findings of this study indicate that the implementation of assessment management practices among lecturers at PSMZA is at a good level. This conclusion is based on the analysis and findings obtained from the study on assessment management, which can be summarized as follows: First, among the six assessed assessment management elements, the results indicate that lecturers at PSMZA have embraced effective assessment management practices and have implemented them consistently across all departments at PSMZA. Second, although there

are variations in assessment management practices between engineering and non-engineering fields, the t-test shows that there is no significant difference in assessment management practices between these two fields. This is in line with the guidelines of the Polytechnic Department of Education, which expects consistent and effective assessment management practices. Additionally, Pearson correlation analysis indicates a weak positive relationship between the engineering and non-engineering departments in the implementation of assessment management. While this relationship does not reach statistical significance, it suggests that educational background does not influence the implementation of assessment management among lecturers at PSMZA. Overall, it can be concluded that the implementation of assessment management practices at PSMZA is at a high level and has been well-implemented by lecturers across all departments at PSMZA in a consistent manner.

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Author Contributions
N. Badaruddin: Conceptualization, Abstract, Introduction, Discussion, Conclusion, Result, Discussion, Writing; **S. A. Ab Rahman**: Data collection, Methodology, Result and Editing; and Writing; **N.W Awang**: Reviewing **W. M. Rizairie**:Editing, Proofreading.

Conflicts of Interest
The manuscript has not been published anywhere else and is not being considered by any other journals. All authors have authorized the review, agree with the submission, and state that they have no conflicts of interest in the work.

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