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Student Coursework Achievement Assessments Intervention Program: A Peer-Review Program to Fix Inconsistent in Grades Assessment

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Abstract

Course grading not only include the assessment of performance in final exams or tests, but also includes the assessment of coursework. The study program at Universiti Teknologi MARA (UiTM) is structured around outcome-based education (OBE), which means that the curriculum is specifically designed to emphasize learning objectives that assess cognitive, affective, and psychomotor domains. The cognitive domain is assessed by final examinations and tests, and the affective and psychomotor domains are evaluated through coursework such as laboratory reports. Examining the Civil Engineering Diploma study program, it is evident that all courses entail coursework, indicating that each course necessitates an assessment that includes assessment by the lecturers. Due to the fact that the majority of these courses are instructed by teaching teams comprised of many lecturers, there is a significant likelihood of encountering assessment issues arising from inconsistent marking techniques. This issue occurs considering the difference of instructor's academic background and working experience that affects their assessment proficiency skills. A comparative analysis of the assessment conducted in the ECW341 course revealed a discrepancy of up to 8 marks between teaching team and course coordinator. This issue has the potential to cause adverse consequences, particularly for students, stakeholders, and the institution. Thus, an intervention program was developed to overcome this coursework assessment issue. This program integrates the synergy between technology and humans with the goal of enhancing the evaluative proficiency of lecturers. The foundation of program development lies in the utilization of the plan-do-check-action (PDCA) cycle and the identification of problem causes as a main guideline for the solutions. Upon implementation of this program, it has had a favorable influence as evidenced by the disparity in team teaching scores, which averages less than 3 marks. Moreover, according to the perception survey of the target group shows that

this program is able to achieve its objectives and have a positive impact. In order as improvement in the future, it is recommended that the potential artificial intelligent elements to be tested and identified as a part of this program. Therefore, it is fitting that this program as a supplementary aid at higher education institutions, given its efficacy in facilitating more precise assessment of the coursework.

Keywords: Course Assessment, Evaluator, Marking Discrepancy, Teaching and Learning Process, Team Teaching.

Introduction

Course work refers to any type of assessment conducted during the lecture period of a semester. It is a fundamental component of the course assessment process, and when combined with the final exam score, it determines the overall grade for the course. The grade reflects the extent to which a student has mastered a subject. An A grade indicates almost total mastery of the material, surpassing students who receive grades of B to E. Put simply, students that earn high grades are those who perform academically by mastering the course material and fulfilling the assessment criteria. Each grade is assigned a numerical value ranging from 0.0 to 4.0. The greatest grade values, 4.0, are given to A+ and A grades, while the lowest grade, F, receives the lowest value. The cumulative grade point average is the collective grade achieved in all courses taken during the duration of the course. The average value of this cumulative grade can determine whether a student graduates with a first-class, second upper-class, second lower-class, or third-class degree. Additionally, this information is stated on both the degree scroll and the graduate academic transcript.

Students who have a high cumulative grade value, are first class graduates, or at least have an upper second-class degree have a distinct advantage in getting accepted for employment and have the possibility to pursue further studies at a higher level. This phenomenon is seen in certain employment advertisements by both commercial and government companies or agencies, where they specifically target individuals who have graduated with second-class honors and restrict the eligibility to only one applicant. Velasco (2012) discovered that individuals who had high academic performance have a greater likelihood of being accepted into the government sector and certain industries in the private sector, such as the financial industry. Similarly, certain universities have specific eligibility criteria for progressing to the master's level. For instance, the Master of Science (Civil Engineering) program at UiTM requires applicants to be graduates of second-class standing and have a minimum CGPA of 2.75 or 2.50. Additionally, they must possess a minimum of 5 years of work experience in the field.

As an example, consider the curriculum of UiTM's Civil Engineering Diploma program; in order to accomplish the program's goals and the learning outcomes defined, students must demonstrate competence in not just the cognitive domain, but also the affective and psychomotor domains. This aligns with the objective of outcome-based education (OBE), which is an educational system focused on learning outcomes. OBE involves designing the curriculum based on the desired learning outcomes that students are expected to achieve at the end of their learning journey (Davis, 2003). In the OBE system, learning outcomes encompass educational objectives, behavioral objectives, performance objectives, subordinate skills, general objectives, and particular competences.

The variability of coursework marks is contingent upon the specific learning outcome that must be attained within a certain course. The scoring distribution for coursework ranges from 10% to 100%. Course percentage breakdown based on coursework grading. The

assessment score for each subject in the Civil Engineering Diploma program is a portion of the total score, as indicated in Table 1. Courses that have a coursework score of 100 are considered to be the highest, whereas a score of 10 is considered to be the lowest. The highest possible coursework grade is 10 marks, which accounts for 44.4% of the total grade. Following closely is a perfect score of 100 points, which represents 16.7% of the total grade. This demonstrates that coursework assessment has an impact not just on the attainment of grades, but also on the overall success or failure of a course.

Various coursework assignments are assessed in the affective and psychomotor domains. These include practical tests, laboratory reports, technical reports, laboratory activities, field work, industrial training, case study assignments, technical drawings, presentations, designs, and mini projects. The scoring is solely determined by the lecturer's assessment in an absolutely objective manner. Due to its association with emotions, feelings, and physical abilities, the affective and psychomotor domain is considered a non-cognitive aspect. Consequently, its examination cannot be conducted using the same methods as those used for assessing the cognitive domain. The cognitive, affective, and psychomotor domains are mutually exclusive, as stated by (Rao, 2020). The assessment is conducted by the lecturer using the grading criteria. Lecturers must achieve a high level of proficiency in assessment student learning and performance. In a study conducted by Azwana et al (2017), it was discovered that the proficiency of an instructor improves as their teaching experience accumulates. This study assessed the level of professionalism among 70 vocational university lecturers, regardless of their location (urban or rural) and considering their diverse characteristics such as gender, age, job experience, and qualifications. According to Mustafa et al (2019), it is acknowledged that acquiring proficient teaching skills and assessment abilities in education necessitate a significant amount of time and preparation. It is evident that assessment skills require greater attention and monitoring, as they are considerably more challenging to enhance within a limited timeframe compared to other abilities taught in professional education. The lecturer is compelled to quickly master the assessment domain in order to prevent any group of students from falling victim to a lack of mastery of the domain, as the course is only offered during a specific semester and the group of students who enroll in the course is distinct each semester. Hence, it is imperative to expedite the process of equipping lecturers with the necessary skills to become proficient assessors. The OBE system highlights that the instructor has a dual role: facilitating the growth of students' knowledge and skills, and simultaneously serving as a competitive evaluator (Guzman et al., 2017).

A scoring rubric is one of the main instruments these days to ensure lecturers wouldn’t assess a different grade to students regards of affective and psychomotor domains. All lecturers will use the same scoring rubric to grade the same coursework. Scoring rubrics are instruments that aid in ensuring consistent assessment among lecturers. They achieve this by providing explicit criteria and methods that are further divided into specific behaviors and features. According to Truemper (2005), the scoring rubric is an assessment instrument used to evaluate tasks. It acts as a guide for instructors and students, ensuring that all parties have a clear understanding of the expectations for completing an assignment. This scoring rubric guarantees the attainment of learning objectives and enhances the quality of student assignments by implementing a feed forward system. However, while utilizing this scoring rubric may offer benefits in the assessment of students, it also presents certain drawbacks that require careful consideration and enhancement (Cox et al., 2015).

Nonetheless, a review of the assessment of some coursework among the 'teaching team' with course coordinators found that there was an average difference of ± 4 marks with the highest mark difference was 8 marks even using the same marking rubric. In response to this issue, a study has been conducted to ascertain the underlying causes. A study conducted at the Civil Engineering Studies Center, UiTM Pahang Branch, revealed that the causes of this problem can be attributed to instructors not adhering to the scoring rubric during assessments, multiple instructors evaluating the same course, limited time for assessment, new lecturers lacking experience as effective evaluators, the scoring rubric lacking specificity and being difficult to comprehend, the assessment method being unsuitable and inefficient, and a lack of monitoring of the assessment process. This assessment issue is not limited to a certain location and requires care, a study also been conducted at Civil Engineering study centers at different campuses and revealed that the problem is prevalent.

Assessment of coursework course grades will be skewed, either upwards or downwards, if accomplishments do not confirm to the scoring system. This will have an adverse impact not just on the graduates but also on the institution as well. The trustworthiness of a graduate is conveyed by the information documented on their degree certificate and academic transcript. The grade in each course serves as an initial indication of one's prospects for the future. From the company's perspective, if the employer believes that this graduate has the capacity to meet their requirements based on their academic performance, then the graduate will be afforded the chance to demonstrate their abilities. Furthermore, the reputation of the university may suffer if the academic accomplishments and proficiency in interpersonal skills, as indicated in the degree certificate and academic record, do not accurately represent the actual abilities of the graduate. This will deter firms from hiring graduates from the same university as their employees in the future. The institution's credibility in producing competent graduates will be called into doubt indirectly. According to Del-Castillo-Feito et al (2020), it is important for higher education institutions to have a positive image, legitimacy, and reputation. This is because it helps them improve their competitive position, regain public trust, and provide a quality assurance to reduce uncertainty for stakeholders. Another consequence is impeding the attainment of the faculty's purpose, vision, and objectives, as well as the broader goals of the university and the national education system. Hence, any error in assessing the course grading would directly influence the prospects of the graduates and the reputation of the higher education institution.

Thus, when examining the underlying cause of this issue, which encompasses the multitude of courses within a program, the diverse approaches to evaluating coursework, the proficiency of the evaluator, and the efficacy of the assessment tool, coupled with the detrimental consequences resulting from the weakness of this problem, it becomes evident that a comprehensive approach must be implemented to narrow down the range of causes and ultimately resolve or mitigate this issue. In their study, Amiruddin et al (2021) concurred that enhancing student accomplishment in an outcome-based education (OBE) study program requires the involvement of skilled and innovative lecturers, who not only focus on the teaching and learning process but also employ effective assessment methods. An obstacle to attaining the purpose of Outcome-Based Education (OBE) arises when the lecturer, who is responsible for implementing the OBE system, has sufficient information of OBE itself (Rahate et al., 2020).

Table 1
Coursework marks for each course in Civil Engineering Diploma study program

Mark	Course Code	Frequency	Percentage (%)
0 – 9	-	0	0.0
10 – 19	ECG243, ECG353, ECS226, ECS248, ECS338, ECW231, ECW241, ECW331	8	44.4
20 – 29	-	0	0.0
30 – 39	-	0	0.0
40 – 49	ECM366, ECG344	2	11.1
50 – 59	ECM157, ECG253	2	11.1
60 – 69	ECM256, ECS358	2	11.1
70 – 79	ECG345	1	5.6
80 – 89	-	0	0.0
90 – 100	ECM377, ECG263, ECW341	3	16.7

Development of proposed solution

As a solution to the issue of lecturers inconsistent towards coursework grades assessment, the student coursework achievement assessments intervention program was developed. This program is developed according to the PDCA model approach which consists of four stages: plan, do, check, and action. This approach was implemented due to its demonstrated efficacy in addressing managerial, teaching, and learning challenges at UiTM in earlier studies (Azirah et al., 2019; Kamilah et al., 2023). The PDCA cycle is an effective strategy for problem-solving in any workplace, as it facilitates a continuous improvement process. This cycle is versatile and easily adaptable, enabling the organization to overcome internal hurdles (Jagusiak-Kocik, 2017).

During the plan stage, the first step is to identify the problems that need to be addressed and prioritize them to avoid them from hindering the management of the institution. The identification of these issues commenced by gathering information documented in audit reports during faculty academic gatherings and research surveys. Four issues were chosen for extensive analysis due to their significance in the teaching and learning process, which is a fundamental aspect of the university's operations, the details encompass the frequency of recurrence, the consequences if it continues, and the anticipated benefits if the issue can be handled. After gathering all the necessary information, the specific issues are then submitted to the Expert Committee at the study center to obtain the input. The SMART technique is subsequently employed to identify the primary issue and probable causes of the problem. The sources of the problem are determined by conduct the study, analyzing existing data, administering surveys, observations, examining study findings and using a root cause diagram. Next, the causes of this difficulty are elucidated utilizing the 'why-why analysis' technique. In order to effectively implement the proposed solution and achieve its objectives, it is necessary to gather information on the analysis of the cause and the proposed solution. This includes examining the main diagram of the proposed solution, evaluating the pros and cons of the proposed solution in relation to the cause, and creating a diagram that illustrates the relationship between the proposed solution and the cause. Solution targets are then established as benchmarks to be attained.

Next do step, the solution proposal that needs to be implemented to solve the problem is planned based on the cause information and its relationship with the solution proposal gained from the plan stage. By the dissemination of ideas, four potential solutions have been identified to address this issue. This proposed solution includes a clear explanation of its implementation process, as well as a thorough analysis of its benefits and drawbacks. Additionally, it includes an estimation of the time required for implementation and a consideration of the financial implications involved. This description is being submitted to the

Expert Committee of the study center for discussion and feedback. From a practical standpoint, this committee will provide feedback on the study center's preparedness and capability, regulatory compliance, and financial consequences. This feedback will serve as a reference for the analysis matrix used to evaluate and selection of problem-solving options. The optimal approach is to develop a program that revolves around the interplay between individuals and technology. The established objective is to obtain over 50% of the teaching team's members to have a discrepancy of less than 3 marks in when compared to the assessment conducted by the course coordinator. The attainment of this primary objective demonstrates that the lecturers have attained the requisite degree of proficiency using a well-defined and methodical grading criterion.

The development of proposed solution commences by consulting target group interviews, research papers, guides, books, and teaching and learning technologies. The acquisition of this data is essential to ensure that the proposed solution may effectively accomplish their goals and objectives, while minimizing expenses and time requirements. Implemented solutions that have been effectively designed are then tested. This step involves the lecturers responsible for teaching the ECW341 (Water and Wastewater Laboratory) course. ECW341 course was selected for the study due to the teaching team consists of more than 5 individuals with diverse teaching experience backgrounds. Additionally, the course is 100% a coursework, and also this course reveals a substantial variation in marks assessment. The study was replicated thrice and spanned a duration of one year, equivalent to two semesters, in order to achieve its objective.

Check stage, a thorough assessment of the implementation of proposed solution is conducted to identify any flaws, which can then be addressed and improved. Achievement review consists of two distinct phases. The first phase occurs during the development of the proposed solution, while the second step takes place after the completion of the proposed solution, when it is deemed ready for implementation. The participants in the initial phase comprised the team teaching of the ECW341 course, but the subsequent phase included all 50 lecturers from the faculty. The initial step involves assessing the attainment of the primary objective, which pertains to the disparity in assessment scores between the teaching team and the course coordinator. Additionally, the accomplishment of secondary objectives, namely the score value of competitiveness and user-friendliness, should be evaluated. Proposed solution should be based on thorough study and consideration of financial implications. In the second phase, the target group's perception of the proposed solution will be assessed based on their assessment of the solutions' effectiveness, efficiency, and user-friendliness after using them for one semester.

Action stage entails the implementation of a standardized strategy which will be carried out in a phased manner. The primary objective is to implement uniformity in the Civil Engineering study center and other study centers at UiTM Pahang Branch. Additionally, the study center of Civil Engineering has been extended to include all branches of UiTM, including UiTM Johor Branch, UiTM Penang Branch, UiTM Sarawak Branch, and UiTM Malaysia. The goal is to standardize this approach at UiTM so that it may be used by all Malaysian universities. Promotional strategies such as conducting a series of workshops, creating articles, and participating in innovation competitions are planned as incentives to introduce this proposed solution.

Student Coursework Achievement Assessments Intervention Program

The primary goal of this program is to ensure the consistency of course work assessment, with the aim of enhancing the assessment skills of lecturers and maintaining a high level of competence. This will ensure that the graduates possess both academic achievements and soft skills that are on par with each other. The implementation of this program is expected to yield advantages for the students, lecturers, and institution itself. From the university's perspective, the primary advantage is to present the institution as a reputable higher education center that upholds integrity and thus will ultimately enhance the institution's reputation. Utilizing technology in the teaching and learning process can be employed to promote the national development agenda, specifically the industrial revolution 4.0 (IR 4.0) and education revolution 4.0 (ER 4.0). The implementation of IR 4.0 technology in ER 4.0 has been deemed successful since the technology is based on the adaptation of the advantages of computers. This approach reduces risk and enhances problem-solving skills, which can support the teaching and learning process to the best of its ability (Moraes et al., 2022).

The underlying principle guiding the development of this program is that a scoring rubric, which is grounded in results-oriented, transparent, and methodical educational standards, may provide consistent assessment of student coursework marks across different lecturers. Furthermore, the utilization of technology is necessary to support and streamline the assessment process. Nevertheless, the paramount factor is the lecturers' inclination to consistently acquire knowledge to enhance their assessment abilities and be open to guidance to accomplish that objective. This initiative includes the enhancement of coursework marking rubrics, the creation of teaching support tools, and the formulation of standard operating procedures (SOP). Figure 2 illustrates the SOP of this program in its entirety. This program includes:

i. A new version (version 2.0) of the scoring rubric
ii. A system that simulates coursework grading
iii. An app that checks simulates mark coursework
iv. Criteria for intervention score
v. Score intervention index

Scoring rubric version 2.0 is a substitute for the regularly used scoring rubric (existing scoring rubric). It was created to address the deficiency of the existing score rubric, specifically the inability to accurately match the scoring of several assessment aspects for a given score, resulting in inaccurate score assessment. The benefit lies in the allocation of weights based on the relative importance of the assessment criteria. The weaknesses in the current scoring rubric can be addressed by making modifications based on the version 2.0 scoring rubric, even if the assessment aspects remain unchanged. Hence, it is recommended to utilize mark new rubric when there are more than two assessment criteria for a grade.

The system incorporates scoring simulations for all types of coursework assessments, including practical examinations, laboratory activities, laboratory reports, and assignments. It capables to thoroughly analyze all assessments in the different formats such as video and other common file extensions. Users are required to input the assessment components to simulate the grading process.

A mobile application was designed to examine the coursework marks given by lecturers for each course code and it allows for the determination of the discrepancy in marks between those assessed by the lecturer and the course coordinator.

The development of a criteria for intervention is to enable the execution of efficient corrective measures. This criterion is determined by calculating the percentage of lecturers who obtain a score below 3, as evaluated by the course coordinator. If over 50% of the lecturers exhibit a discrepancy of 3 or more marks compared to the course coordinator, it indicates that a majority of the lecturers lack clarity in their understanding of how to utilize the scoring rubric. Conversely, if fewer than 50% of the lecturers exhibit a discrepancy of 3 marks or fewer in comparison to the course coordinator, it indicates that the lecturers' assessment abilities are doubtful. The score intervention index is used to discern the proficiency of a lecturer's assessment abilities for a particular course. During this stage, suitable remedial actions can be implemented to ensure that the assessment aligns with minor score discrepancies.

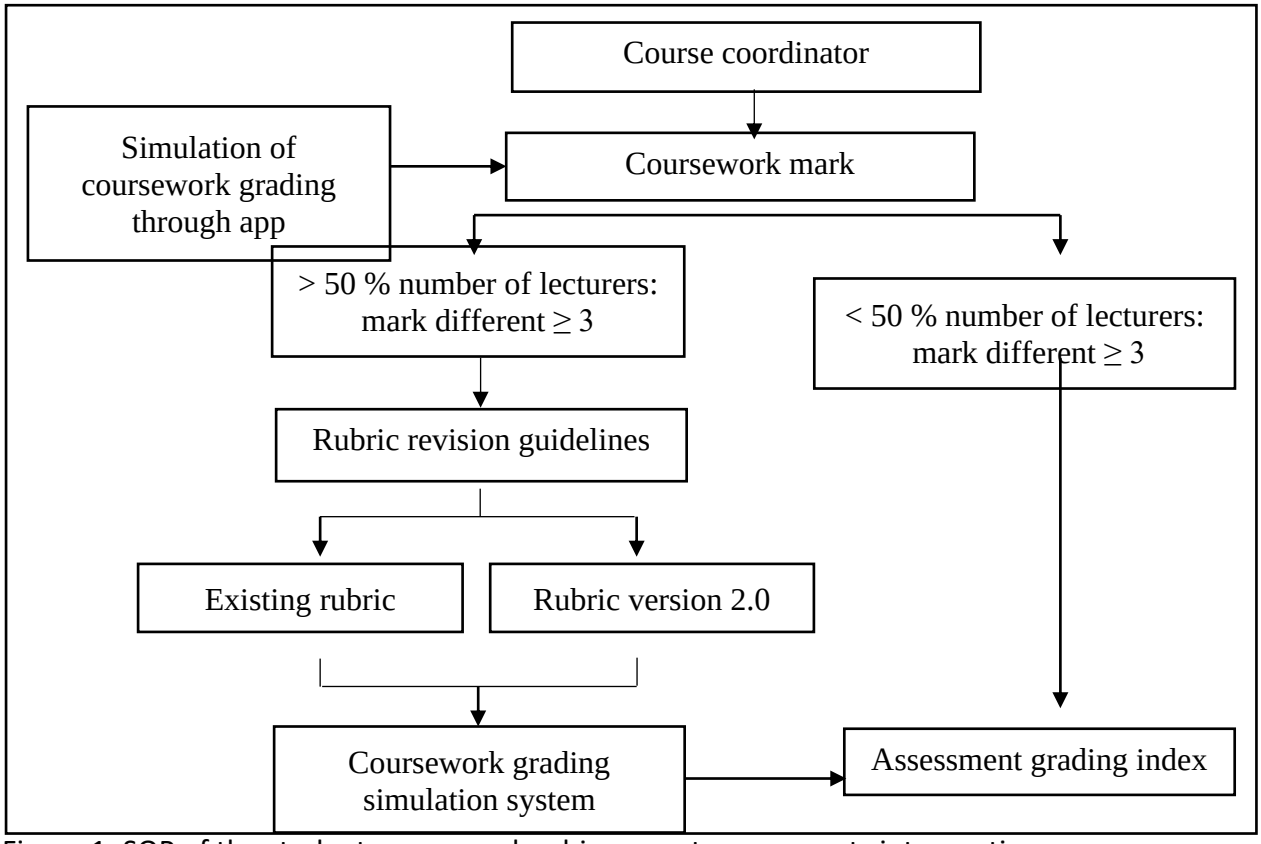

Figure 1: SOP of the student coursework achievement assessments intervention program

P1 - Perception							
Element	Weightage	Rubrics	Marks	Element	Weightage	Rubrics	Marks
Recognise/choose the apparatus/reagents	0.5	Unable	0	Conduct laboratory	0.5	Unable	0
		Able	1			Major help	1
						Minor help	2
						Without help	3
						Without help and clean the apparatus	4
P2 - Set							
Element					Weightage	Rubrics	Marks
Display the right use of personal protection equipment (PPE)					1.0	Unable	0
						Able	1
P3 – Guided response							
Element	Weightage	Rubrics	Marks	Element	Weightage	Rubrics	Marks
Assemble the apparatus/equipments	0.5	Unable	0	Setup the apparatus/equipments	0.5	Unable	0
		Able	1			Inaccurate	1
						Accurate and within given time	2

Figure 2: Rubric assessment version 2.0

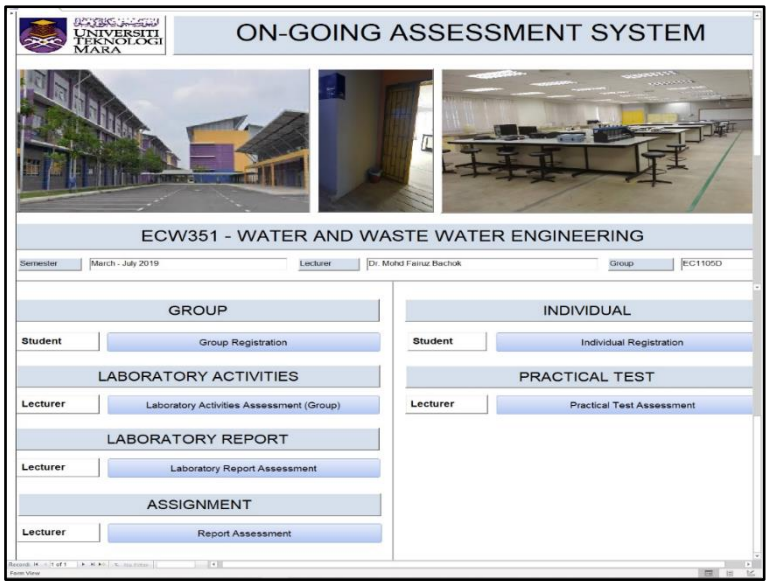

Figure 3: Coursework grading simulation system

Figure 4: Simulation mark coursework application

Table 2
Score Intervention Index

Category	Disparity in scores	Impact of a disparity in scores	Action to be taken
Good	< 3	Has no effect on grade levels	• Encouraged to make use of the simulated grading system for coursework
Tolerable	3 – 5	Alter a grade by 1 level	• Must employ a simulation approach for grading coursework.
Poor	6 – 9	Alter a grade by 1 or 2 level(s)	• Must employ a simulation approach for grading coursework. • Seeking clarification from the course coordinator regarding the categorization of rubric scores.
Very Poor	> 9	Alter a grade by 2 or 3 levels	• Must employ a simulation approach for grading coursework. • Seek out the course coordinator for fundamental advice on grading coursework.

Project Outcomes

The proposed program aims to enhance the proficiency of lecturers in assessment the courseworks. Furthermore, its objective is to mitigate the repercussions of this issue in the assessment process and provide advantages to students, lecturers, and institutions overall. This program aims to minimize the occurrence of inaccurate assessment problems and ensure consistency in the control measures for assessors and assessment measurement tools. This will be achieved through the development of new guidelines, procedures, and support tools, as well as the improvement of existing ones.

Proactive measures such as identifying probable causes, collecting information from multiple sources to develop proposed solution, presenting these solutions, conducting experiments, distributing questionnaires to specific groups, and seeking expert opinions is to ensure the program meets criteria.The criteria for selecting a system include its systematic and user-friendly nature, efficient operation with minimal time and high operational expenses, low chance of failure, ability to be utilized for scoring other courses, and ease of adaptation. The sole purpose of this solution proposal is to successfully accomplish its specific objectives and to be competitive overall.

An analysis of the score disparity before and after the program's implementation demonstrated a higher level of competence in the lecturers' assessment of the coursework. The data indicates that 80% of the lecturers in the teaching team have a discrepancy of less than 3 marks, while the remaining 20% have a discrepancy ranging from 3 to 5 marks. Prior to the implementation, less than 50% of lecturers in the teaching group had a discrepancy of less than 3 marks, while some had a difference of up to 8 marks. Furthermore, the mean score is 4.58 out of 5.00, and the t-test comparison results indicate that the proposed approach successfully brings about positive change and accomplishes the objective. This suggested approach has achieved a high degree of advancement and can be widely applied to address this assessment issue. Another beneficial effect is the reduction of operating costs, with the potential to decrease spending for a course in a semester by up to 45%. These savings result from less paper and print usage, as well as reduced time spent on assessment management. The financial ramifications associated with the creation of a cost-effective proposal are one of the aspects that enable the implementation of this program in any institution of higher education.

Conclusion

An understanding of the assessment of student coursework is a crucial ability that lecturers must possess at a high level of competency in the teaching and learning process. Erroneous, opaque, and uniform assessments will adversely affect students, the lecturers themselves, and the institution. Assessment issues may readily occur when a study program includes numerous courses with a significant proportion of coursework grades. Simultaneously, it is necessary to assess this coursework, which solely examines the affective and psychomotor domains, across many student cohorts. It signifies that the assessment is based on personal judgment and relies only on the lecturer's assessment. Furthermore, it is necessary for the assessment to be conducted by multiple lecturers using a same scoring criterion. The effectiveness of mitigating the impact of this issue is attributed to the program's development strategy, which not only restricts the occurrence of this problem but also incorporates a corrective peer review process. This process allows lecturers to determine if their assessment skills have reached the required level of competence. Hence, if any

deficiencies are identified in the assessment criteria throughout the assessment process, appropriate actions should be implemented.

Thus, in conclusion, it is crucial to consider the program's implications in both its absence and presence. In the absence of this program, the ongoing occurrence of discrepancies in marks based on the established marking criteria will persist without detection. The flaws in the lecturer's assessment and the marking rubric will remain unidentified, resulting in an unfair assessment of students. The lecturer's approach to assessment will become negligent, posing a threat to the overall objective of national education goals, particularly within the faculty and UiTM as a whole. If this program is implemented, it can effectively regulate the variation in marks and enhance the consistency of grading. Additionally, it can identify and rectify any shortcomings in the lecturer's assessment and the marking rubric. This program ensures that students receive fair and appropriate assessment, while also encouraging lecturers to be meticulous and comprehensive in their assessments. By achieving the objectives of national education goals, the faculty and UiTM can fulfill their mission. Furthermore, implementing this program can lead to cost savings in management operations. Hence, it is desirable that this initiative is not confined alone to UiTM, but rather its application is extended to all other tertiary institutions.

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