

THE EFFECTIVENESS OF USING MICROCREDENTIAL FOR WRITING GUIDELINES ON STUDENT PROJECT TECHNICAL REPORT

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This study explores the effectiveness of using microcredential as a structured approach to improve student's understanding and application of writing guidelines in project technical reports. Microcredentials, which offer concise, focused learning experiences, were introduced as a supplementary tool to guide students in mastering key components of technical report writing, including format, clarity, content organization, and compliance with academic standards. It also exposes students to fully utilize the tools and menus available in Microsoft Word to achieve an organized writing structure for technical report. The research involved Information Technology (IT) students whose enrolled in an Integrated Project course at Politeknik Ungku Omar. Pre and post assessments, student feedback and evaluation of submitted reports were used to measure the impacts. Findings indicate that students who completed the microcredential demonstrated significant improvements in the quality and consistency of their technical reports. Students reported increased confidence, better understanding of structural requirements, and enhanced skills in presenting technical information clearly and professionally. The study concludes that microcredentials are an effective, scalable method to reinforce writing guidelines and improve student performance in technical report writing. The integration into academic programs is recommended as a strategy to support learning outcomes and align student competencies with academic and industry expectations.

Keywords: *microcredential, writing guideline, project, technical report*

1.0 INTRODUCTION

In the evolving landscape of higher education, there is a growing emphasis on skills-based learning and demonstrable competencies. Microcredentials which offer short, focused certifications that validate specific skills or knowledge, have emerged as a powerful tool in this context. It is particularly valuable where continuous learning and skill enhancement are essential for career advancement and adaptability in rapidly changing industries. Meanwhile, technical report writing is a critical component of engineering, science, and technology education, where students are expected to communicate complex ideas clearly, accurately, and professionally. However, many students face challenges in adhering to established technical writing conventions and structuring comprehensive, standards-based reports. Despite existing curriculum, students often lack the targeted, practice based instruction needed to meet professional writing expectations.

By integrating microcredentials focused on specific elements of technical writing such as structuring reports, incorporating visuals, referencing sources, and adhering to formatting guidelines, lecturers can provide competency based learning that directly supports students in developing essential writing skills. Research has shown that microcredentials can improve student motivation, autonomy, and engagement by provide clear learning outcomes and recognition for skill development. When embedded in technical project courses, microcredentials can serve both as a formative learning tool and as a framework for assessment. This dual role aligns with outcomes-based education models and supports continuous improvement in writing practices. Furthermore, the implementation of microcredentials can support instructors in standardizing guidelines for technical report writing across departments and institutions. By establishing clear, granular writing competencies, microcredentials can enhance transparency in expectations and promote consistency in feedback and evaluation. They also encourage the adoption of best practices in instructional design and curriculum alignment. Microcredential for project technical report was to utilized and enhance the quality and consistency of technical reports by providing self-training that aligns with institution final year project guidelines. Microcredentials is a self-learning tool for students to generate standard template of technical reports through a customize setting in Microsoft Word. Assessment tools in microcredential will help students to evaluate their own understanding and the expectation for technical report documentation requirement. The utilization of microcredentials in the domain of project technical report guidelines and preparation represents an innovative approach to professional development and skills enhancement for students. Given these potential benefits, exploring the use of microcredentials to guide and assess student technical report writing presents a valuable opportunity for educational innovation.

Ahsan et al., 2023 also state that the implementation of microcredentials in higher education is gaining traction, with institutions recognizing their potential to revolutionize learning and skill acquisition. These credentials can be integrated into existing programs to enhance the quality of student outputs, such as technical reports, by providing clear guidelines and competency-based assessments. Refer to Alenezi et al., 2024, microcredentials serve as a bridge between formal education and professional practice by providing students with recognized qualifications that are valued by employers. They offer a flexible and accessible way for students to acquire and demonstrate skills, which is crucial in fields where documentation and technical writing are essential.

Problem Statement

In most higher education institutions, students need to prepare their technical report based on manual guidelines by Institution. Students usually manage their report formatting manually, causing unsynchronized format and further expose to higher probability of errors. Most students are weak in writing because they are not skilled in using the tools available in Microsoft Word or any text editor. They do not use all the tools and menus perhaps because they do not know or have never used them. Most of the reports produced are of very poor quality and do not meet the set guidelines. There is no standardization between the text formats which causes confusion to the readers of the reports.

Lecturer need to correct errors related to writing format repeatedly to obtain quality report results that comply with the reporting format that has been outlined. Lecturers will also take longer time to review and make corrections on the formatting which is avoidable as they should relatively focus on the content of the project technical report. Students should be able to then use the template for their project content on a one-time basis term by coordinating the format besides minimizing the risk of errors and increase probability of getting good marks for their technical report.

Objectives

The effectiveness of using microcredentials for writing guidelines on student project technical reports can be understood through the lens of enhancing specific skills and competencies in a structured manner. Delaney & Brown, 2002 state that microcredentials focus on specific skills, allowing students to gain expertise in technical writing, which is often not covered extensively in traditional curriculum. By integrating microcredentials, students can receive structured guidelines and assessments that align with industry standards, such as those set by IEEE for software engineering documentation. This research aims to investigate the effectiveness of microcredential in improving student writing performance in project technical report writing.

Main objectives are:

- i) To evaluate the impact of microcredentials on students' technical writing performance, focusing on clarity, structure, language use, formatting, and adherence to academic and industry standards.
- ii) To assess student perceptions and engagement with microcredentials as a learning and assessment tool for technical writing.

Research Scope

This research focuses on exploring the integration of microcredentials as a structured tool for developing and delivering writing guidelines specific to student project technical reports. The study is situated within higher education, particularly targeting undergraduate students engaged in project courses in disciplines such as engineering, computer science, information technology, and applied sciences, where technical report writing is a core requirement. It will assess how the use of microcredentials impacts students' acquisition of technical writing skills. Key indicators include clarity, organization, adherence to formatting standards, and effective communication of technical content in final reports.

2.0 LITERATURE REVIEW

Microcredentials are specialized certifications that recognize specific skills and competencies acquired through short learning experiences. They have gained traction in digital education, particularly since the introduction of the Open Badges system by the Mozilla Foundation in 2011. Refers to Stamatakis et al, 2004 these credentials offer flexible, targeted learning opportunities, making them increasingly popular among learners and employers alike, especially in rapidly evolving fields like technology. Micro-credentials are typically awarded as digital badges upon completion of a course or program. It is focus on specific skills, allowing for quick validation of expertise. Ahsan et al., 2023 mentioned that microcredentials also support lifelong learning and career development by enabling continuous skill updates without long-term commitments.

Durak & Çankaya, 2024 state that the integration of microcredentials in higher education is transforming traditional learning models. Institutions are exploring innovative pedagogical strategies to enhance the effectiveness of micro-credentials. And that challenges include standardization and recognition across different educational systems. Venaruzzo & Diaz, 2025 state that for learner experience, effective microcredential design considers learner motivation and the need for self-regulation. Engaging activities, such as industry-relevant case studies and portfolio creation, enhance the learning experience. While microcredentials present numerous advantages, such as flexibility and targeted skill acquisition, concerns about their standardization and recognition persist. Addressing these challenges is crucial for maximizing their potential impact on education and workforce development.

Writing a technical report involves a systematic approach that ensures clarity, organization, and effective communication of technical content. Sherman, 2005 mentioned that report writing must be in order and establish a clear structure before writing, including sections like motivation, methods, results, and discussion. Hering & Hering, 2024 state that report writing must follow a sequence of planning, realization, and checking to ensure all necessary elements are included. Radhakrishnan et al., 2016 state that incorporating Technical Writing Assistants (TWAs) can enhance the quality of reports, particularly for students needing support in grammar and organization. Institution have to develop rubrics to assess the quality of technical writing, ensuring that reports meet academic standards. Utilize peer feedback to refine the report, ensuring it meets the expectations of the intended audience. While the structured approach to writing technical reports is essential, some argue that creativity and personal style should also play a role in making reports more engaging and relatable to readers.

Using microcredentials to guide students in report writing can enhance their skills and confidence through targeted learning experiences. Microcredentials serve as digital badges that recognize specific competencies, allowing students to demonstrate their abilities in a structured manner. This approach not only supports academic growth but also aligns with the evolving demands of higher education and the job market. Gilete & García, 2024 state that microcredential courses can focus on essential skills such as research techniques, time management, and writing clarity, which are crucial for effective report writing. Students who engage in micro-credential training report higher levels of motivation and confidence, which can lead to improved performance in writing tasks. Stamatakis et al. (2024), also mentioned that microcredentials offer flexible learning opportunities that can be tailored to individual student needs, making them an attractive option for diverse learners. Refers to Ling & Ling (2023), incorporating micro-credentials into the curriculum can provide a clear framework for students to acquire and demonstrate their writing skills. It will give best practices to the students in order to develop their writing skills. While micro-credentials present a promising avenue for enhancing report writing skills, there are challenges in ensuring that these credentials maintain academic rigor and are integrated effectively into existing educational frameworks. Balancing skill acquisition with comprehensive knowledge in a field remains a critical consideration. Bozkurt & Brown (2024), also mentioned that for Assessment and Feedback, microcredentials are assessed against defined criteria, ensuring that students receive constructive feedback on their writing abilities.

3.0 METHODOLOGY

This study uses a quantitative approach to evaluate the effectiveness of using microcredential for writing guidelines in student project technical report. Respondents are from final year students, Programme Diploma in Information Technology (Digital Technology) at Ungku Omar Polytechnic. Quantitative research methodology was used to quantify variables and generalize results from a sample to the population. A systematic and orderly approach and rules have been devised to guide the research. Several meetings are conducted to ensure the process runs smoothly and achieves the objectives of the study.

Study Planning & Preparation

At this phase, formation of a researcher's group, setting objectives and setting Research Questions (RQ) has

been implemented. Objective setting is very important to produce quality results and answers specific and comprehensive study boundary. There are 16 Research Questions (RQ) as shown in Table 1 and developed using google form.

Table 1: Research Question

SECTION A: DEMOGRAPHIC
A1. Name
A2. Registration Number
A3. Class
SECTION B: ORGANIZATIONAL ASPECTS
B1. Front page is simple and attractive
B2. The content is clearly displayed
B3. The content is organized in an orderly manner
B4. Graphical information displayed can attract readers' attention
B5. The images used are appropriate for the content.
SECTION C: CONTENT ASPECTS
C1. The contents provided are concise.
C2. Contents provide explanations in an organized manner
C3. The contents are easy to understand
C4. The contents explain how to use it completely.
C5. Graphic information and tips help in understanding notes
C6. Assessment questions can help the understanding
SECTION D: LEARNING OUTCOMES ASPECT
D1. Microcredential can provide brief guidance on writing project reports
D2. Microcredential helps students to design project writing
D3. Microcredential helps project writing be more structured
D4. Microcredentials help project writing be easier to develop
D5. The functions in Microsoft Word are very helpful in writing project reports.

Data collection

Data collection has been implemented to the students who registered for the Integrated Project course and will be developing their final project and producing a technical report related to their final project. The link for questionnaire was distributed by email and social media to the respondents.

Data analysis and reporting

Data analysis is done quantitatively on each research question using statistical software, SPSS. This analysis is presented using tables to summarize data in a clear way. Analysis of this data can provide insight initial whole and become the basis of this study. The analysis findings for each research question are represented with mean values and become the basis for measuring impact findings.

4.0 RESULTS/FINDINGS

This section presents the outcomes of the study on the effectiveness of microcredential implementation as a supporting tool for writing guidelines in student project technical reports. Data were collected through surveys and assessments review involving 61 final-year students who participated in the microcredential module over one academic semester, as shown in Figure 1 below.

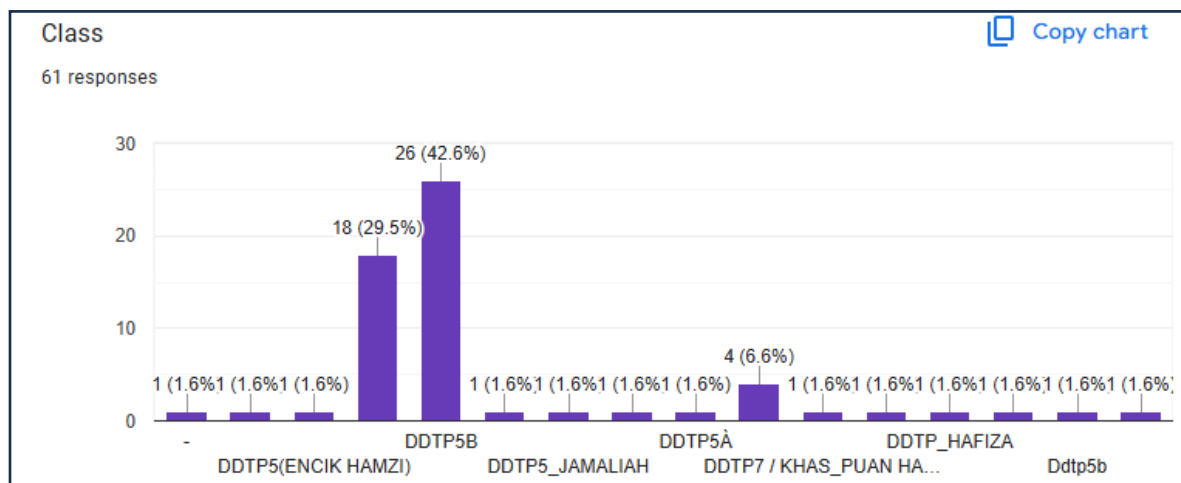


Figure 1: Respondent demography

This study measured students' perceptions of the effectiveness of using microcredentials in assisting in the writing of technical reports for student projects. The assessment was conducted through several questionnaire items using a Likert scale (1 to 4). Table 2 shows the mean value for the main variables in the questionnaire.

Table 2: Mean Value for main variables

	Mean	Std. Deviation	N
B1	3.79	.413	61
B2	3.82	.388	61
B3	3.84	.373	61
B4	3.77	.424	61
B5	3.85	.358	61
C1	3.82	.388	61
C2	3.79	.451	61
C3	3.80	.401	61
C4	3.82	.388	61
C5	3.85	.358	61
C6	3.84	.373	61
D1	3.77	.424	61
D2	3.80	.401	61
D3	3.85	.358	61
D4	3.75	.434	61
D5	3.84	.373	61

Table 3: Interpretation for Standard Deviation

SD Value	Interpretation
< 0.5	Very low variability – respondents mostly agree
0.5 – 1.0	Moderate variability – some differences in opinions
> 1.0	High variability – diverse opinions among respondents

Based on the findings in Table 2 and interpretation value of Standard Deviation in Table 3, it show that all items including organizational (B1-B5), content (C1-C6) and learning outcome (D1-D5) aspect, had mean values above 3.7, indicating a high level of agreement with the statements given regarding the effectiveness of using microcredentials.

The very low standard deviation (below 0.5) for all items indicates that respondents provided very consistent answers, with very minimal differences in views. This gives the impression that students accept the use of microcredentials as a guide for writing their technical reports and have an almost uniform perception of their effectiveness. At the same time, the very low standard deviation values indicate that student views are very consistent, with almost all respondents sharing the same perception of aspects such as understanding writing formats, report structure, and increasing confidence through microcredential learning. This decision is also in line with current needs in higher education which emphasize self-skills, the effectiveness of digital learning, and student competence in providing quality technical documentation.

5.0 DISCUSSION / ANALYSIS

The level of reliability of the study can be determined by using the interpretation of the Cronbach's Alpha value which has a range between 0.00 and 1.0. According to Bond & Fox (2007), the Apha Cronbach (α) is acceptable reliability is between 0.70 – 1.00 where it is at its best (70% - 100%) described in Table 2. The results of this study analysis found that the reliability value referring to the Cronbach's Alpha value is 0.961 as shown in Table 3, and it shows that the instrument is in very good condition and effective with a high level of consistency and can be used in real research.

Table 2: Interpretation of the Cronbach's Alpha Value

Alpha-Cronbach Score	Reliability
0.9 – 1.0	Very good and effective level of consistency
0.7 – 0.8	Good and acceptable
0.6 – 0.7	Acceptable
<0.6	Item need to be repaired
<0.5	Items need to be dropped

Table 3: Cronbach's Alpha Value

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.961	.961	16

The results of this study are in line with the findings of a study by Gikas and Grant (2013) which stated that the use of digital materials such as microcredential increased student engagement in technical learning. Students felt that microcredential gave them flexibility in terms of time and place of learning, especially when carrying out practical activities independently or in groups outside of lecture hours. In the context of polytechnics, microcredential help students revise more systematically without having to rely on physical textbooks which are limited in number. However, there were some feedback from students who stated shortcomings in terms of the microcredential interface which was less interactive and the lack of simulation-based exercises. This shows that although the overall effectiveness is high, there is still room for improvement in terms of pedagogical design of microcredential contents and materials.

Impact of the study

- Impact for instructors: The use of microcredential can be a key component in teaching technical courses, but instructors need to ensure that microcredential are equipped with supporting activities such as practical videos, simulation links, and interactive quizzes to reinforce student understanding.
- Impact for institutions: Polytechnics can expand the use of microcredential as formal teaching materials by providing training to lecturers on the design of effective pedagogically based digital materials.
- Impact for students: Students should be encouraged to use microcredential not only as reference materials, but also as active learning tools by integrating digital notes, markers, and multimedia resources.
- Impact for industry: equipping students with the skills to produce well-structured, professional technical reports, the microcredential helps bridge the gap between academic output and industry expectations.

6.0 CONCLUSION

This study has shown that the use of microcredentials as a guide for writing technical reports for final project students is an effective, relevant and high-impact approach. The microcredential module developed not only improves students' understanding of the structure, format, and important elements in writing technical reports, but also improves the overall quality of the reports produced. The results of the study showed significant improvements in the aspects of writing structure, use of accurate technical language, adherence to standard formats, and use of correct reference sources. In addition, feedback from students and supervisors indicated that the self-learning approach through microcredentials provides flexibility, accessibility, and a more focused learning experience. From an industry perspective, mastering technical documentation skills through microcredentials can help graduates be better prepared for the workplace, while also reducing the need for initial training. This contributes to the development of more competent and competitive human capital.

7.0 LIMITATION AND STUDY FORWARD

Although this study shows positive results on the effectiveness of using microcredentials in assisting students in writing technical reports, there are several limitations that need to be considered:

- Sample Size and Implementation Period: The sample size was limited to 61 students, and the implementation of the module was only for one semester. This period may not be sufficient to see the long-term impact on technical writing skills.
- Focus on Writing Aspects Only: The study only assessed the effectiveness from the perspective of technical report writing, without looking at its impact on other skills such as oral presentation, critical thinking, or problem solving.
- Technology Acceptance Level: There is a small proportion of students who face difficulties accessing microcredential content due to technical constraints (such as unstable internet access or unsuitable devices).

Based on the above limitations, some suggestions for further research are as follows:

- Expanding the Scope of the Study by conduct research across multiple institutions, academic programs, and levels of study to gain a more comprehensive picture of the effectiveness of microcredentials.
- Conduct a longitudinal study to see whether the skills acquired through microcredentials remain relevant and used after graduation, especially when entering the workforce.
- Expanding microcredential modules that not only focus on technical writing, but also include elements such as research ethics, information literacy, and professional communication skills.
- Study on Student Usage and Motivation Levels by focus on psychological and pedagogical factors such as self-motivation levels, effectiveness of online learning styles, and the impact of microcredentials.

8.0 ACKNOWLEDGEMENT

This paper was fully supported by Jabatan Teknologi Maklumat & Komunikasi, Politeknik Ungku Omar and cooperation with Kolej Komuniti Gopeng Perak. Apart from helping to deliver achievement information for the department, this study gives the researchers the opportunity to learn and gain exposure to research experiences. Sincerely, with a big heart, the researchers would like to express incredibly gratitude to all individuals who supported directly or indirectly during the investigation, analysis, implementation, and success steps of this research. Whether through participating in surveys, providing feedback, or offering words of encouragement, each contribution was counted as a valuable contribution.

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