MICROCREDENTIALS FROM THE PERSPECTIVE OF BUSINESS AND INDUSTRY (DUDI): A MACHINE LEARNING ANALYSIS

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Abstract

Microcredentials are becoming a new approach in education and training that is increasingly popular, especially in facing the challenges of the industrial revolution 4.0. This study aims to analyze the perspective of the Business and Industry World (DUDI) on the implementation of microcredentials in Indonesia. Data were obtained from Focus Group Discussions (FGD) involving representatives of DUDI and several related ministries. FGD data in the form of Minutes of Meeting (MoM) and audio recordings were processed using machine learning techniques to identify patterns, perceptions, and preferences of DUDI regarding microcredentials. The results of the analysis show that DUDI sees microcredentials as a strategic tool to fill skills, but there is a need for further collaboration between the government, educational institutions, and industry in developing clear and relevant standards. In addition, machine learning methods are able to provide deeper insights into the sentiments and main topics that emerge in the discussion, which can be the basis for further development policies and programs. This study provides an important contribution in understanding how DUDI views microcredentials and offers practical recommendations to optimize the implementation of microcredentials in an industrial context.

Keywords: Microcredentials, Business World and Industry World (DUDI), Machine Learning, Focus Group Discussion, Education and Training.

1 INTRODUCTION

Microcredentials in the industrial world refer to certifications or recognitions given to individuals who have demonstrated specific skills or expertise in a particular job or industry. In 2021, 78% of industries or companies faced difficulties in finding highly skilled and high-level employees. Only 7.7% of companies allocated budgets for employee education and training, and less than 5% of the workforce had professional certifications. Additionally, among the 8.4

million unemployed workers, most had post-secondary education backgrounds (BPS, 2022). This highlights the urgent need for reskilling and upskilling, even for those with higher education degrees.

Higher education institutions are expected to play a significant role in providing programs that help the Indonesian workforce in reskilling and upskilling efforts. The Directorate General of Higher Education (Ditjen Dikti) launched the Microcredential Program in 2021 under the "Merdeka Belajar, Kampus Merdeka" initiative to improve the quality of university graduates, aligning them with industry needs. This program was the first in Indonesia to use the term "microcredential" instead of "short courses."

In 2022, Ditjen Dikti integrated the Microcredential Program into a broader and more rigorous scheme, the Certified Independent Study and Internship Program (MSIB). The journey of the offered Microcredential programs can be seen in Figure 1.

Figure 1. Microcredential Programs Offered by the Ministry of Education and Culture

Universities are also collaborating with industries to offer microcredential programs for reskilling and upskilling needs. Although similar programs have been running for a long time under the name Short Courses, microcredentials have gained high popularity in Indonesia and are utilized in various forms for diverse purposes, such as the Pre-Employment Card Program, Digital Talent Scholarship, Google Bangkit, and the Game Developer Microcredential Program.

The recognition of microcredentials by formal educational institutions and their integration into qualification levels has been made possible by existing regulations and have been practiced at both school and higher education levels. While the perspective of microcredential program providers is very positive, there is still limited information on how DUDI, as users or recipients of graduates or employees with microcredential certificates, perceive these programs. This study aims to understand the perspective of DUDI on the implementation of microcredentials in Indonesia. Additionally, this study uses machine learning-based analysis to analyze data from Focus Group Discussions (FGD) conducted with various DUDI stakeholders.

2 METHODOLOGY

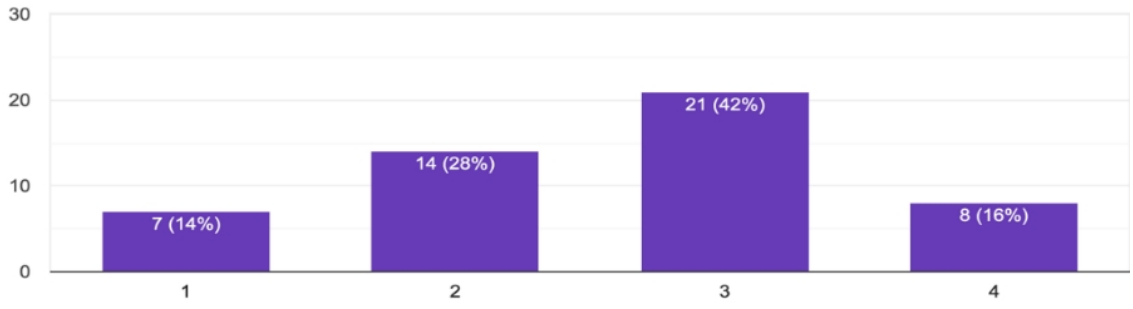
This study uses survey and FGD methods to collect data from DUDI representatives. The survey was conducted online with a questionnaire designed to measure understanding, expectations, and challenges related to microcredentials. FGDs were conducted to gain in-depth insights into DUDI's perspective. FGD data were analyzed using text mining techniques with the help of the Natural Language Toolkit (NLTK) in Python. The text mining process included converting data from video to text, cleaning the data, and descriptive analysis to find patterns and trends in the FGD transcripts.

3 FINDINGS AND DISCUSSION

Based on the identification of key topics from the FGD on DUDI's understanding and expectations of microcredentials and specific skill needs, the following results were obtained.

3.1 Understanding and Expectations of DUDI towards Microcredentials

Most respondents understand microcredentials as programs that enhance specific skills relevant to industry needs. However, there is variation in the level of understanding, with some respondents still not fully grasping the concept. This indicates the need for further socialization about microcredentials, especially regarding their benefits and applications in the workplace. According to Brown and Mhichíl (2020), microcredentials are an effective solution to address skill gaps in the labor market, especially in the context of the industrial revolution 4.0. However, uneven understanding of microcredentials can hinder their widespread adoption and implementation.



Category: 1 = not understood, 2 = somewhat understood, 3 = understood, and 4 = very understood

Figure 2. Respondents' Understanding Levels about Microcredentials

DUDI's expectations of microcredentials are very high, particularly in terms of practical application in the workplace. DUDI expects these programs to provide skills that can be directly applied and add value to the company. However, there are doubts about the extent to which microcredentials can apply these skills in the workplace. Therefore, it is important to ensure that microcredential programs are designed with a focus on practical skills needed by the industry. Fong, Janzow, and Peck (2016) emphasize that microcredentials should be designed to meet the specific needs of the industry to provide maximum benefits for companies and employees.

3.2 Challenges in Implementing Microcredentials

One of the main challenges in implementing microcredentials is the gap between learning content and daily job demands. Some respondents feel that the learning content in microcredential programs does not fully align with industry needs. This indicates the need for closer collaboration between microcredential program providers and DUDI to ensure that learning content is relevant and up-to-date with industry developments. Kato, Galán-Muros, and Weko (2020) suggest that collaboration between the government, educational institutions, and industry is crucial to developing clear and relevant standards.

Additionally, the standardization and validation of skills obtained through microcredentials are also challenges. DUDI wants clear competency standards and regulations that ensure the quality of microcredential programs. Without clear standardization, it is difficult for DUDI to recognize and trust microcredential certifications. Therefore, efforts are needed to develop competency standards that are widely recognized by the industry. Wheelahan and Moodie (2021) emphasize the importance of developing widely recognized competency standards to ensure the quality and recognition of microcredential programs.

3.3 Machine Learning-Based Analysis

3.3.1 Text Mining

Text mining is a technique used to extract useful information from unstructured text by identifying patterns and trends in text data (Feldman & Sanger, 2007). In this study, text mining helps identify key words that frequently appear in discussions, reflecting the most relevant topics and issues for FGD participants. For example, the words "industry" and "program" indicate that discussions often focus on how microcredentials can be applied in the context of industry and training programs. The words "skill" and "digital" indicate that digital skills are a

major area of concern, while "certification" highlights the importance of formal recognition of skills obtained through microcredentials.

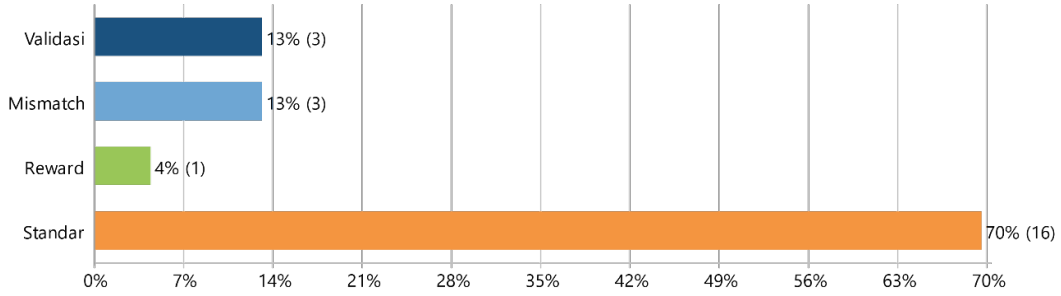


Figure 3. *Frequency of Words Appearing in FGD on DUDI's Expectations of Microcredential Programs*

The main challenge currently is related to standardization. There is a need for standardizing certifications obtained through microcredentials to be widely recognized by the industry.

3.3.2 Word Cloud

Word cloud visualization shows that topics such as technology, education, and processes are also major concerns in discussions about microcredentials. Word cloud is a data visualization tool that displays words in various sizes, where the size of the word reflects its frequency of occurrence in the text (Heimerl et al., 2014). In this study, word cloud is used to provide a visual overview of the most frequently discussed topics in FGDs.

Figure 4 Distribution of Common Tokens in FGD Transcripts (excluding stop words and punctuation)

By analyzing the generated Word Cloud (Figure 4), the topics that emerged during the FGD include "industry, program, skill, digital, certification, education, technology, and process." The topic "skill" indicates that FGD participants see skills as a key element in the implementation

of microcredentials. The topic “education” indicates significant attention to how microcredentials can be integrated into the education system. Meanwhile, the topic “process” indicates discussions on how microcredentials can be effectively implemented in the industrial context.

3.4 Recommendations for Developing Microcredential Programsl

Based on the findings of this study, several recommendations for developing microcredential programs in Indonesia are as follows:

1) **Socialization and Education:** More intensive socialization about the concept and benefits of microcredentials to DUDI and the general public is needed.
2) **Collaboration with Industry:** Microcredential program providers must collaborate with DUDI to ensure that learning content is relevant to industry needs.
3) **Standardization and Validation**: It is necessary to develop competency standards that are widely recognized by the industry to ensure the quality and recognition of microcredential programs.
4) **Focus on Digital Skills**: Microcredential programs must focus on digital skills that are highly needed by today's industry.
5) **Development of Practical Skills:** Microcredential programs must be designed with a focus on practical skills that can be directly applied in the workplace.

By following these recommendations, it is hoped that microcredential programs in Indonesia can be more effective in improving the skills and competitiveness of the workforce, as well as meeting the needs of the ever-growing industry.

Microcredentials are increasingly recognized as a viable solution to address the skills gap in the workforce, particularly in the context of the industrial revolution 4.0 (Brown & Mhichíl, 2020; Fong, Janzow, & Peck, 2016). These short, focused courses offer certifications that validate specific skills and competencies, making them highly relevant in today’s rapidly evolving job market (Kato, Galán-Muros, & Weko, 2020). The flexibility and efficiency of microcredentials allow individuals to acquire and demonstrate specific skills in a shorter time frame compared to traditional degree programs (Miller & Olthouse, 2020). However, the successful implementation of microcredentials requires collaboration between the government,

educational institutions, and industry to develop clear and relevant standards (Wheelahan & Moodie, 2021).

4 CONCLUSION

This study significantly enhances our understanding of how the Business and Industry World (DUDI) perceives microcredentials and offers practical recommendations to optimize their implementation within an industrial context. The findings reveal that DUDI views microcredentials as a strategic tool for addressing skill gaps and enhancing workforce capabilities. However, the success of microcredentials hinges on the establishment of clear standards and the relevance of these programs to industry needs. This necessitates a collaborative effort among stakeholders, including the government, educational institutions, and industry, to develop and implement standardized frameworks that ensure the quality and recognition of microcredentials across various sectors.

The application of machine learning techniques in this study has provided deeper insights into the sentiments and main topics that emerge in discussions about microcredentials. By analyzing the data from Focus Group Discussions (FGDs), the study has identified key themes and patterns that reflect the priorities and concerns of DUDI. These insights can inform the development of policies and programs that support the effective implementation of microcredentials. The use of advanced analytical methods has not only enriched the findings but also demonstrated the potential of machine learning to contribute to educational research. Overall, this study offers valuable contributions to the discourse on microcredentials and provides a foundation for future initiatives aimed at optimizing their use in an industrial context.

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