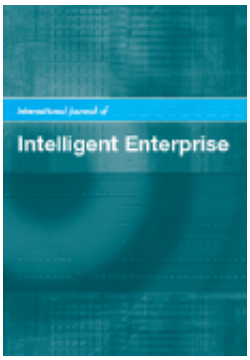

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Higher education leaders' readiness to implement micro-credentials in Malaysia: a preliminary insight

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Abstract: Higher education institutions (HEIs) in Malaysia have taken significant strides in integrating micro-credentials into their educational systems. However, the specific designation and status of micro-credentials for university leaders within these institutions are still evolving. Despite these challenges, there is a strong commitment to preparing for their implementation. While research on Malaysian university leadership at the faculty level remains limited, this study sought to explore the readiness of university leaders to embrace micro-credentials within HEIs. By employing a qualitative approach and focusing on the ongoing advancements in Malaysian higher education aimed at enhancing student success, this case study engaged with five university leaders, including deans, deputy deans, and department heads. The findings illustrate how these leaders, as interdependent stakeholders, are driving change and redefining their roles through systematisation. The thematic analysis identified five key themes, underscoring the opportunities to enhance support systems, technological skills, and leadership engagement for successful implementation. This study also highlights the pivotal role of university leaders in championing the integration of micro-credentials into the educational landscape of HEIs.

Keywords: micro-credentials; university leaders; higher education leaders; preliminary insight; semi-structured interviews; technological disruption; existing educational structures.

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1 Introduction

The education landscape is swiftly changing, driven by the widespread influence of digital technology, notably artificial intelligence (Pedro et al., 2019). Crucially, micro-credentials become a key part of this future-shaping as they provide the authority to justify and authenticate competencies and skills without undergoing typical long-winded education (Adekola and Aribisala 2023). This progression emphasises the need for a thorough investigation into the readiness of education leaders to integrate micro-credentials into their institutions seamlessly. Therefore, it is necessary for the leaders to assess their readiness for these transformative transitions as higher education institutions (HEIs) worldwide are implementing strategies relating to micro-credentials (Al-Maaitah et al., 2024). This eventually led to the rise of micro-credentials, also called alternative digital credentials (ADCs) and nano degrees (Darien and Belinda, 2019; Selvaratnam and Sankey, 2020; Zanville and Ton-Quinlivan, 2020).

In contemporary education, micro-credentials have emerged as an encouragement of innovation, drawing increasing attention as a transformative approach to learning (Aravind et al., 2023). Unlike traditional educational structures, which often follow rigid, monolithic models, micro-credentials offer a dynamic and responsive alternative that better aligns with the diverse needs of learners in today's fast-paced world (Darien and Belinda, 2019). This novel educational paradigm allows individuals to acquire specific knowledge and skills tailored to their career aspirations. It provides a flexible pathway for upskilling or reskilling in response to evolving market demands (Oliver, 2019).

Micro-credentials provide a modular way to learn so that individuals can make their own paths, picking and choosing courses and credentials based on what they need to be successful in their career or out of personal interest. This ability is vital now more than ever for career-driven individuals who want to stay relevant in a world that keeps being disrupted and changed by technology (Ghozali et al., 2023). In addition, micro-credentials represent a flexible way to meet changing industry needs. As the skills required for employment are transient in today's tenuous labour market, micro-credentials provide a nimble answer to an immediate problem (Shanahan and Organ, 2022). They provide people with the opportunity to learn new competencies in their own field so they can be up-to-date without fear of giving all that time for conventional degree programs (Joshi et al., 2023). The ability to learn quickly, which is the core of agility in learning, empowers professionals to become abreast with new trends and developments (Ghozali, 2023; María et al., 2023) for a successful career within changeable industries.

Furthermore, the granular nature of micro-credentials allows for targeted and efficient skill development, which is particularly beneficial in addressing specific gaps or areas of interest within an individual's expertise (Shen et al., 2023). This focused approach to learning enhances professional development and fosters a lifelong learning culture, encouraging continuous growth and adaptation to new challenges (Kadiresan et al., 2024). As industries evolve and adapt to changing landscapes, micro-credentials offer a flexible and responsive tool for individuals to stay ahead of the curve and thrive in their careers. Micro-credentials' significance in this transformative educational landscape has not gone unnoticed in academic discourse (Ghozali et al., 2022). Notable researchers like As Desmarchelier and Cary (2022) as well Oliver, 2019 have stressed like that micro-credentials are taking the lead. This is a major issue for the field of 21st-century Education, who have extolled this as an educational revolution that will result in 'job-ready graduates' able to navigate change and challenge throughout their working lives (Tripathi and Al-Zubaidi, 2023).

The IR 4.0 and digital transformation have multiplied micro-credentials at the top in terms of educational innovation (Padmanabhan et al., 2023). Their flexible, competency-based approach aligns with the demands of individuals seeking continuous skill development and the rapidly changing needs of industries (Raj et al., 2024; Srinivas et al., 2023). Scholars and educators on the forefront of micro-credential research are well positioned to influence how education and workforce development will respond in an era defined by technological disruption (Saxena et al., 2023). The growing role of micro-credentials within the broad expanse of higher education had emerged as a trend prior to the pandemic but can be considered among its disruptions, according to Brown (2021). The resulting boom in demand marks a tectonic change in how HEIs are modelling and dispensing their curriculum (Dionisio et al., 2023). The need for the post-pandemic reimagining and redesign of education is also resulting in more organisations seeking to broaden opportunities, particularly as systems continue to shift away from traditional educational pathways toward favouring non-traditional learners with global study options (McGreal and Olcott, 2022). This diversification of educational markets represents an acknowledgment that one-size-fits-all brick-and-mortar schools are no longer well matched to fulfill the needs of diverse learners around the globe (Maaitah, 2023).

In this evolving educational landscape, micro-credentials have emerged as a compelling solution (Wheelahan and Moodie, 2021). These modular, skill-focused credentials offer a flexible and adaptable approach to learning, aligning well with the

shift toward online and flexible education (Rajest et al., 2023). This enabled learners to gain specific competencies and knowledge appropriate for their possible career or the obligation of work (Estolonio et al., 2023). This adaptability is particularly valuable in addressing the rapidly changing demands of the job market, where specific competencies hold increasing value (McGreal and Olcott, 2022). Micro-credentials serve as a bridge between traditional degree programs and the evolving needs of industries (Wheelahan and Moodie, 2021). Rapid development and proofs of competence on certain competencies quickly become crucial as industries transform. One strategy that aids in this process is the use of micro-credentials to help learners acquire and present job skills quickly (Sadath and Faheem, 2024). This has generated significant scholarly interest in the transformative potential that micro-credentials may have on higher education (Brown, 2021). With universities still grappling with the obstacles of a post-pandemic world, micro-credentials allow for flexibility and expansion in what programs are available on campuses (McGreal and Olcott, 2022). With a focus on catering to non-traditional and international learners, meeting the increasing demand for online education, micro-credentials provide an avenue to foster higher education that is more agile, affordable, and applicable to evolving learner and industry needs. Therefore, they serve as a major learning system to higher education than before, and it could have enormous impact on the future of educational activities (Jasper et al., 2023).

A few of the HEI in Malaysia are coming forward to embrace micro-credentials across their educational ecosystem. This corresponds to one of the United Nations sustainable development goals (SDG) – SDG-4 Quality Education, and also 8. The integration of micro-credentials will ensure that educational institutions in Malaysia allow a level learning playing field for all students globally to learn from education programs, irrespective of where they are based or their background. This is in line with one of the recommendations mentioned under the Malaysia education blueprint 2015–2025 to improve and enhance range offerings, he said. School enrollees will now be required to complete one term in a placement of at least many weeks for practical experience.

The higher education digitisation plan in Malaysia, for instance, was launched forward as an initiative to incite and capitalise on the digitisation objective among higher learning institutions across… This included the development of micro-credential courses (Philip et al., 2024) as specifically elaborated example. Mirroring these successes within Malaysian HEIs the micro-credential movement was only recently established as an achievement after 2019, when MQA having made a milestone towards legitimisation of micro-credentials; who have then implemented formal accreditation strategies to recognise micro credentials in higher education sector of Malaysia (Ministry of Education Malaysia, 2015). What seems to be noted, though noteworthy at that, is: for all its development regarding these credentials, we still find a marked absence of research that investigates the practical application and results provided by them in a Malaysian context. The scarcity of holistic empirical studies opens an intriguing and fertile ground for scholars and researchers to dig into. Therefore, as Alrawashdeh et al. (2024) stated in their paper, this virgin land also invites a closer examination of wider opportunities and contributions micro-credentials can play within different educational settings.

This emerging stage of research on micro-credentials in Malaysia offers a unique opportunity for scholars in education, leadership, and social sciences to contribute significantly to understanding how micro-credentials are adopted, adapted, and integrated into the country's educational landscape. Previous research has focused on three

main areas: implementing micro-credentials within HEIs, participant feedback on micro-credential programs, and the broader implications of micro-credentials on educational and socio-economic outcomes. Literature primary to these aspects can be considered as the studies closely related with institutional readiness, policy framework, and faculty excitation and handholding support system, which are vital for smooth blending of micro-credentials in the educational ecosystem (Chung et al., 2020; Ahmat et al., 2021).

The scarcity of previous research and the uncharted territory of education leaders' preparedness to handle micro-credentials at a local level gives an encouraging trail for academics who want to investigate how efficient or in what ways micro-credentials could be introduced within Malaysian HEIs (Ahmat et al., 2021). Because there is a lack of research specific to the preparation of education leaders (e.g., principal, department chair, or teacher leader) around scheduling micro-credentials, this may appear as something new. Research focused on transitions at all levels continues to be well-researched, but these have not occurred across sectors such that our understanding within professional development should therefore continue to receive inquiry with pre-service educators – i.e., how we prepare future teachers throughout their initial certifications? While interest in micro-credentials is increasing, there exists a gap in scholarly literature surrounding the perspectives of education leaders on how they might operationalise and adopt micro-credentials at HEIs.

The grassroots level within HEIs, where micro-credentials are being put into practice and managed daily, is crucial. Recognising the readiness of education leaders within this context is important for informing optimal design (implementation strategies, contract terms) and differentiating outcomes. Research in this area could explore multiple dimensions, including knowledge and understanding of micro-credentials from educational leaders; preparedness for transition within HEIs; challenges associated with such changes to practices in learning and teaching environments; skills required and resources needed, whether uncommon or more accessible, etc. Closing these research gaps would offer insights on how education leaders might be situated in the practice of awarding micro-credentials, helping shape future policies and practices related to this initiative within Malaysian higher education.

2 Literature review

The fourth industrial revolution (IR 4.0) has brought about major radical changes at the societal level due to the fast-moving pace of digital technology development. HEIs, too, are not untouched by this paradigm shift; in fact, they have seen an incredible integration with digital sophistication. It has been a time requiring the most redefining of teaching and learning paradigms, with virtual spaces becoming new crystalline educational frontiers. HEI leaders have been taking note of the changing scenario and adopting a proactive attitude to respond intuitively in order to use digital for betterment. For instance, the establishment of micro-credential guidelines by the MQA is an example of how proactively universities in Malaysia are responding to this new reality. The publication 'guidelines to good practices: micro-credentials,' containing these guidelines, further exemplifies the fact that Malaysian higher education is definitely moving toward embracing micro-credentials.

In the ever-evolving realm of education and professional development, micro-credentials have emerged as a dynamic tool, providing learners with certified evidence of achieved learning outcomes from shorter, focused educational or training activities. Defined as certified documents attesting to specific competencies or skills, micro-credentials offer a flexible and transparent means of validating learning achievements (MicroHE Consortium 2019). This essay explores the micro-credentials landscape, delving into their characteristics, types, affordances, barriers, and potential integration with academic credit. Micro-credentials are recognised proofs of attained learning outcomes, focusing on competency-based skills and knowledge. These credentials may or may not be stackable towards larger accreditation units, depending on the provider and the intended purpose of the micro-credential. The justice system does not have a single universally agreed-upon definition of the term 'micro-credential,' such as online certificates, alternative credentials, nano-degrees, or micro-masters (Brown et al., 2021). Micro-credentials refer to small learning opportunities concerning knowledge, skills, and competencies associated with the requirements of society, individual needs, but also socio-cultural requests from the labour market (Kušić et al., 2022).

Such diverse terminologies are one of the causes leading to variations in what is meant by, known as micro-credentials across the globe. However, one or two fundamental concepts are agreed upon: the learning experiences leading to an award and in itself (merged micro-credentials), which is most often referred to as a credential (Ahmed and Jassim, 2021). Micro-credentials can serve to upskill for career mobility and also address skill gaps in the workforce (Varadarajan et al., 2023). Micro-credentialing courses, ones that are specifically desired by industries and offer 'short bursts of very specialised learning focused on gaining a specific skill' (Ruddy and Ponte, 2019), aim to increase the knowledge level in students enabling them for 'upskilling and reskilling.' This can dramatically increase the employment opportunities accessible to students and allow them to keep up with industry requirements. Further, once the learners complete each module successfully in compliance with certain criteria of that course, they issue digital badges or certifications – which are known to hold a worldwide value right in your job market. A Digital Badge image is an educational element (Ahmed and Jassim, 2021) backed by data that includes who issued it, to whom – and under which conditions – the recipient met the requirements. Ahmat et al. (2021) maintained that the use of digital credentials boosts learner motivation and recognition.

Effectively creating and advancing them as a legitimate, mainstream option for skills-building or up-levelling is impeded largely by these divergent interpretations resulting from the lack of consensus among stakeholders on what they are – i.e., their nature (components) along with value. In addition, micro-credential programs can only be effectively planned and executed by experienced educational professionals who know what they are doing, including academic officers and high-ed leaders. One of the biggest obstacles, though: how to wrangle vast numbers of students into these online courses. These micro-credential certification programs are run through online classes, so there may be the opportunity to appeal to a larger demographic of students all over (Alias, 2020). The other thing that needs to happen is the micro-credential modules must be exportable, but at what point can you then scale it? Asportation of credentials, experienced in digital badges wherever on the globe, is very important (MicroHE, 2019). A significant concern is the potential competition that could arise between micro-credential certifications and traditional degrees. Some worry that this competition

might reduce the number of students enrolling in degree programs, especially if employers begin to prefer micro-credentials. Additionally, this shift raises important questions regarding the future quality assurance of these certifications, which are currently overseen by the MQA and universities. Many universities already have internal guidelines or policies for micro-credentials; however, these guidelines may not align consistently with broader higher education standards, necessitating adjustments to enhance their complementarity.

Critical for broadening micro-credential certification access is the extent to which institutions are willing and able to devote a level of resources, especially around facilities and infrastructure (Ralston, 2021). In addition, using technology tools like video production equipment and eLearning software can greatly amplify course development by delivering engaging learning experiences that also make an impact. In addition to this, an effective micro-credentials regime depends on all stakeholders, such as educators and learners, having basic digital literacy (Cirlan and Loukkola, 2020). Fostering these skills is crucial in order to participate and gain the most out of micro-credential programs. Being well-prepared also involves having a technical support team that is available at all times and comes to aid during each stage, be it developing the courses or maintaining an online platform. Certainly, the costs have not been low to make it so far possible to offer micro-credentials on this scale and successfully deliver them; there has had to be significant financial outlay embedded in all these preparations needed related investments in IT infrastructure upgrades materialised with technical support services. However, numerous barriers hinder the widespread adoption of micro-credentials in higher education. One significant challenge is the lack of senior leaders who comprehend micro-credentials and advocate for their integration as catalysts for change (Darien and Belinda, 2019). This leads to inadequate allocation of financial and human resources for implementing micro-credentials and a lack of incentives for faculty engagement, hindering cooperation. Moreover, perceiving micro-credentials as optional additions rather than strategically aligned with institutional goals further impedes resource allocation and integration efforts (ICDE, 2019; Kato et al., 2020; Matkin et al., 2020).

This is why university top management and micro-credential providers should spend a bit more financial resources on it in order to make sure that they cater to the best. When creating new online portals, third-party subscriptions for these platforms and essential technology tools should all be categorised accordingly. Hyper-connectivity is seen as crucial to solve, since stable and secure internet access enables the realisation of micro-credential programs (Chung et al., 2020). By infiltrating micro-credentials into higher education, it stands as a beacon of hope for the needs of learners, educators, and employers in our digital future. Of course, that transition is not always an easy one. Varadarajan et al. (2023) showed that problems – there were different issues in the challenges 2023, such as

1 varied stakeholder perceptions of what micro-credentials are and how much they add may necessitate a degree of alignment to build consensus

2 establishing international recognition, addressing concerns of potential competition with traditional degrees, and coordinating guidelines across institutions are efforts toward minimising adoption barriers at a large-scale level

3 sufficient deployment of resources, financial aid, and technology (Ahmat et al., 2021)

4 Effective stewardship does require leadership advocacy for smaller micro-credential programs to be effective.

Through managing the listed difficulties and exploiting micro-credentials affordances, HEIs are able to facilitate learners with appropriate skills for the 21st-century labour market. The proactive stance of institutions like the MQA, as evidenced by developing guidelines for good practices in micro-credentials, sets a precedent for embracing this transformative educational approach (MQA, 2017). With further research and collaboration, micro-credentials have the potential to bridge the gap between education and industry needs, empowering individuals to succeed in the IR 4.0.

3 Methods

Our goal was not to test any formal hypotheses (which at this stage are likely premature and most appropriate for deductive research, or subsequent multivariate analysis), but rather to develop a deeper understanding of university leadership experiences by building upon personal narratives. The main data collection approach was qualitative due to its exploratory nature, and this design choice corresponded with the methodological orientation of Taylor et al. (2015). The use of a case study design allowed the research to move into direct contact with participants' experiential knowledge, exploring their perceptions and experiences as they related to participating in micro-credentials for leadership. In this way, it was possible to study the intricate and careful facets of leadership that are likely to go unnoticed in purely quantitative means. Importantly, the emphasis on qualitative inquiry ensured that detailed and rich accounts of university leaders were captured, which were critical to understanding their experiences qualitatively. Leaders were interviewed for data collection, allowing the researchers to probe further into the nuances of their leadership evolution. The intention of this study was to get at the subjective, experiential aspects of leadership that are ultimately so powerful in understanding leadership within academic contexts, especially as it fits into discussions around micro-credentials. This approach was fundamental for reaching the research purpose of this study.

4 Data collection

This study used key informant interviews as its predominant data collection method and a thematic analysis approach to analysing the results. The sampling process was carried out through purposeful methods. We purposefully sampled informants due to their involvement in the study and chose them for having considerable experience, a high degree of knowledge on the issue at hand, and key positions within their faculty. This purposive sample allowed us to capture experienced perspectives from coordinators, heads of department and program (HoD/HP), and deputy dean-level staff members collaboratively involved in implementing the micro-credential initiative at both faculty-wide as well as university levels. Their perspectives are critical in informing the results of this study and improving relevancy to addressing needs and opportunities for micro-credential adoption in higher education. The interviews were conducted over research data from a study area of five public universities. The study incorporated five

respondents, and they were all academicians of these universities. The borderline for the choice of informants was established with very precise criteria. Informed consent was obtained from all informants before the interviews. The interview questions were about micro-credentials, understanding of participants, the control that educational leaders have over institutional matters (Table 1).

Table 1 Participants from selected public university leaders

Informant	*Zone*	*Years of experience as HEI leader*
Informant A	East Coast	10 years
Informant B	North	7 years
Informant C	North	8 years
Informant D	Central	5 years
Informant E	South	4 years

Source: Authors

4.1 Data analysis

This involved a rigorous multimodal data collection, including the organisation, integration, and synthesis of different sources (field notes, debriefing notes, and verbatim transcripts from 4 one-to-one in-depth interviews). Given that these interviews were online, this allowed extensive scrutiny of the problems associated with micro-credentials in a university context. To achieve a variety of perspectives, the respondents were carefully chosen from different expertises and backgrounds, which contributed to better understanding. The four people interviewed were deans, deputy deans, and program coordinators from different aspects of university leadership. The interviews took between 30 and 45 minutes, allowing each participant to share experiences that could get into detail. The qualitative data underwent thematic analysis, whereby researchers identified and reviewed ongoing themes surrounding the barriers faced in micro-credential implementation. The researchers produced trustworthier and more resilient findings as a byproduct of the integration of multiple different views and perspectives on what is meant to be studied through these insights, which were synthesised from all interviews (Green and Thorogood 2018). To strengthen the trustworthiness of this study, member checking (i.e., respondent validation) was utilised by providing a digest to participants which demonstrated themes emerging from the data. This entire process was used in order to have participants review, provide feedback on, or confirm findings. The triangulation of this method greatly improved the validity and exhaustiveness, which made sure that, in the end, there was a reliable representation of what research participants experienced.

5 Finding and discussion

Analysis of the data showed that there were five main themes which captured aspects about how leaders perceived micro-credentials. Most higher education leaders expressed positive sentiment around the prospects of implementing micro-credentials at their institutions. They identified potential workforce development benefits of these credentials

– the competencies students might gain earning them, and how that could better connect education to industry demands. Nonetheless, even these eager leaders faced a number of considerable hurdles in their attempts to further micro-credentials at their institutions. Some of these challenges are linked to resource allocation; while others have been in recruiting faculty for training and ensuring quality assurance.

Table 2 Assessment of higher education leaders' preparedness to implement micro-credentials in Malaysia

Factors	*Preparedness level*	*Challenges identified*	*Support needed*	*Current initiatives*	*Future directions*
Understanding of micro-credentials	2	6	9	5	9
Institutional readiness	5	3	6	3	1
Faculty Support	7	5	7	1	4
Technological infrastructure	8	1	7	6	2
Policy framework	3	8	9	1	4

Table 2 serves as a quantitative evaluation of the above factors toward Malaysia higher education leaders' readiness to implement micro-credentials. Key areas are represented in the rows – understanding of micro-credentials, institutional readiness, faculty support and engagement with MCs, technological infrastructure, and policies. The columns represent the different parts, such as readiness, related obstacles identified, support required, existing work, and future directions. The values in each cell are numbers between 1 and 10, which indicate the importance or power of that factor. In the context we just used, larger values are more ready or harder (depending on what information you start from). The table gives an instant view of the field, indicating areas that might require further focus or resources when introducing micro-credentials into the Malaysian higher education system. Based on our interviews with academic leaders in HEIs, we now showcase how they discussed important aspects of their roles.

5.1 Concept of micro-credentials

One of them is Malaysia, which has implemented a policy on micro-qualification short courses. Most of these courses are offered as part of micro-credential programs within HEI. Therefore, all the informants have a rich knowledge of micro-credentials. Micro-credentials are also perceived as a subset of educational technology. Their introduction expanded with the 2020 spread of the COVID-19 pandemic. Integrating massive open online courses (MOOC) and Learning platforms for micro-credentialing in higher education became commonplace. Most of the informants stated that smaller fractions of faculties in their institutions offered subjects with micro-credentialing capabilities. Using technology for learning is apparent in the rise of micro-credentials – small online qualifications you can earn. The trend was even more hyped due to the COVID-19 pandemic, where people tried new ways of learning online while staying at home. The fact that universities are beginning to propose more flexible solutions for learning, as our speakers highlighted, is significant. The analysis of the dataset showed that among all informants (Table 3), micro-credentials are considered a multifaceted concept.

Table 3 The concept of micro-credentials as perceived by the informants

Concept	*Explanation*	*Informant*
Flexibility	Micro-credentials offer flexibility in terms of delivery, duration, and learning pathways	IA, IC, ID, IE
Recognition and validation	Micro-credentials are designed to be recognised and valued by employers, educational institutions, and other stakeholders	IA, IB, IC, IE
Lifelong learning	Micro-credentials support lifelong learning by enabling individuals to update and expand their skills throughout their careers continuously	IA, IB, IC, ID, IE
Alignment with Industry needs	Micro-credentials are often aligned with industry needs and emerging trends, ensuring that learners acquire skills in demand in the workforce	IB, IC, ID, IE
Modularity	Micro-credentials are modular units of learning that focus on specific skills, competencies, or knowledge areas	IC, ID, IE

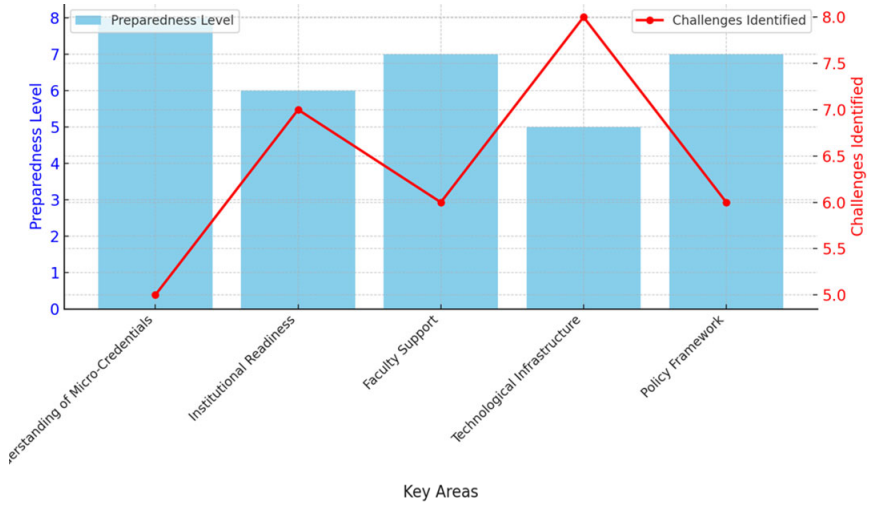
The above dataset and analysis strongly demonstrate that the informants agree upon numerous dimensions within the concept of micro-credentials. In sum, micro-credentials are popular among educators and university leaders but only being used by HEIs to accelerate the pursuit of macro credentials.

5.2 Human resources

For micro-credentials program development, this responsibility is usually the sole reason for a university learning centre to employ at least some lecturers (who are SMEs on topics). There is, however, as a development centre for developing micro-credential programs meant to be attended by every single member of each UNI faculty, they are in short supply. In addition, the content developers are lecturers who typically have domain knowledge in their topic areas and develop micro-credential courses for this project. But in doing so, they have overwhelmed themselves, and then it led to the degradation of these micro-credential courses. Upon inquiring from all the informants about how tech-savvy they rated their college lecturers, there emerged a universal vote that pronounced the lecturer's proficiency to be less than average. There are several reasons for this observation. Firstly, some lecturers, particularly the Tech Savvy generation, have a better knowledge and awareness of technology. On the other hand, there are still large numbers of lecturers who are part of the generation above, and they often prove to be more traditional when it comes to new technology or changing their teaching methods.

In Figure 1 there are the readiness levels and challenges faced by higher education leaders in Malaysia regarding the introduction of micro-credentials. The bar graph illustrates the preparedness levels across five main areas: understanding of micro-credentials, institutional readiness, faculty support system, infrastructure, and policy. The readiness levels are somewhat better, with most scores ranging between 5 and 8. In contrast, the line graph indexes the key challenges identified in each area, also with values between 5 and 8. Areas where challenges overlap with preparedness, like technological infrastructure and policy framework (the yellow bars), align closely. By comparing the strengths and challenges in this mixed graph format, the study delves into areas where extra support or intervention may be required to facilitate a successful transition toward the adoption of micro-credentials in Malaysian higher education.

Figure 1 Comparative analysis of preparedness levels and challenges in implementing micro-credentials in Malaysian higher education (see online version for colours)



From the above analysis, the human resource aspect discussed in the context of micro-credentials programs sheds light on its significant impact on HEI leader preparedness for embracing and effectively implementing such initiatives. Furthermore, the overburdening of lecturers, who are tasked with developing micro-credential courses in addition to their existing responsibilities, compromises the quality and effectiveness of these programs. This scenario underscores the need for HEI leaders to recognise and address the resource constraints their academic staff faces. Leaders can help by building the support systems and also facilitating more instructional design content development jobs to share some of this load with lecturers, so that micro-credential courses are top-notch in terms of quality. The level of technological competency among lecturers emerges as a critical factor influencing HEI leader preparedness for micro-credentials. The excerpt indicates a moderate level of technological proficiency among lecturers, with variations observed across different age groups. While younger lecturers may demonstrate higher levels of technological savvy, older faculty members may resist adopting new technologies, potentially impeding the integration of innovative teaching methods and digital platforms necessary for delivering micro-credential programs effectively.

HEI leaders must prioritise efforts to enhance the technological literacy of their academic staff through targeted training and professional development initiatives. By equipping lecturers with the necessary skills and competencies to leverage educational technology tools and platforms, leaders can foster a culture of innovation and adaptability within their institutions, laying the groundwork for successful micro-credential implementation. Human resource challenges associated with micro-credential development and delivery profoundly affect HEI leader preparedness. Addressing staffing shortages, supporting academic staff, and promoting technological literacy is essential for leaders seeking to embrace micro-credentials as part of their institution's educational offerings. By prioritising investments in human capital and fostering a supportive environment for innovation, HEI leaders can position their institutions for success in the rapidly evolving landscape of higher education.

5.3 Conveniences and substructures

A high-quality micro-credentials program requires good facilities and infrastructure such as IT support teams; state-of-the-art classrooms/labs to deliver the courses/programs for students in a fully online world – e-platforms working according to student needs (if you have purchased new platforms) ICT helpdesk available 24hrs/day, stable email service without downtime periods experienced by staff/students or candidates taking exams where they were using online exam tools. As such, schools need to confirm that these resources are available for the sustainability of the program. It is well-equipped facilities not only serve the purpose of facilitating effective teaching and learning but also push educators to craft high-quality resources for their students. This highlights the importance for education institutions to start with providing state-of-the-art technology that in turn helps new modes of learning and teaching.

Facilities and infrastructures when discussed in respect of programs for micro-credentials highlight their importance as a backbone to successful and sustainable initiatives. Good facilities are a must for learners to receive the quality education they deserve. This selection introduces Informant A who highlights the need to have high-speed internet capacity for micro-credential programs as this directly correlates with their authenticity locally and at a global level. This last sentence hammers home the essential role of digital in the micro-credentialing ecosystem that is low-cost online-only education based. If the internet connection is unreliable, learners will not be able to use these programs effectively, reducing their opportunity for learning from educational material and interacting with instructors.

Moreover, the availability of suitable physical spaces, such as future-ready classrooms or laboratories, is crucial for facilitating hands-on learning experiences, particularly in fields requiring practical skills development. While the focus of micro-credentials is often on online delivery, certain disciplines may necessitate in-person or hybrid learning formats to ensure the acquisition of practical competencies. Therefore, educational institutions must invest in designing and maintaining modern learning environments equipped with the latest technology and resources to support diverse learning modalities. Additionally, the financial aspect of infrastructure development poses a significant challenge for many institutions. However, establishing and maintaining the requisite infrastructure incurs substantial costs, including investment in IT support teams, digital platforms, and instructional technology tools. Limited financial resources may impede institutions' ability to provide the necessary infrastructure for delivering high-quality micro-credential programs, thereby restricting access and scalability.

According to Ahmat et al. (2021), limited funding remains the major hindrance to its sustainability. Insufficient funding can impede the ability to attract qualified professionals, invest in innovative technologies, and effectively market micro-credential programs. From robust internet connectivity to modern learning spaces and adequate financial resources, addressing infrastructure needs is essential for ensuring equitable educational opportunities and fostering learners' success in the digital age. Therefore, strategic investment and planning in this area are paramount for institutions seeking to establish and expand their micro-credential offerings.

5.4 Accreditation

Informants shared feedback that reported micro-credential establishment is yet marginally achieved on account of untenable recognition at ground levels, locally and globally. But two informants shared an exception, informant D and informant E, saying that they recognised their micro-credentials program by MQA. All informants unanimously agreed that work to address quality in the program is an important part of raising its status, both nationally and also internationally. To that end, they suggest comparing with reputable international universities known for producing successful micro-credentials offerings might offer a good beginning point. A model, which they explained is successful elsewhere, can be found in Universiti Sains Malaysia (USM), where both their online lifelong learning programs have been able to attract local and international students, particularly for nursing courses.

Hence, accreditation is a cornerstone of HEI leader preparedness for micro-credentials, significantly impacting program recognition and quality assurance locally and globally. While many institutions face challenges establishing fully recognised micro-credential programs, Informants D and E noted exceptions, citing recognition from the MQA for their initiatives. This accreditation signifies adherence to established benchmarks and standards, instilling stakeholder confidence and facilitating credit transferability. HEI leaders recognise the pivotal role of accreditation in validating program rigor and relevance, with global accreditation emerging as a strategic imperative to enhance program reputation and competitiveness. By aligning with international standards and benchmarking against well-established universities, leaders aim to elevate the visibility and desirability of their micro-credential offerings on a global scale.

Moreover, accreditation catalyses continuous improvement and innovation within HEIs, prompting leaders to refine and enhance micro-credential programs to meet evolving industry needs and educational standards. The endorsement of micro-credentials by accrediting bodies validates their relevance in addressing skill gaps and workforce demands, driving efforts toward program excellence. HEI leaders are thus motivated to secure accreditation from reputable bodies and benchmark against global standards to enhance program credibility and competitiveness. Through these endeavours, institutions can assert their leadership in the dynamic landscape of higher education, ensuring the relevance and efficacy of micro-credential offerings in preparing learners for success in the digital age.

5.5 Leadership

The findings indicated that the success of micro-credentials in university is a result of what resolutions have been made by upper top management. This study results show that university leaders face unique and layered challenges when embedding micro-credentials into quality assurance systems at the level of their institutions. It was learned through this study that the challenges related to micro-credentials emerge from low acceptance levels, high value and time expenditure for program development, financial restraint, and lack of infrastructure to run individual programs simultaneously in large amounts as well as global accreditation focus has been diverting management attention away towards securing the local market rather than international placement with strong determination. However, they can also enable the wider facets and prove a market fit for micro-credentials as reskilling or upskilling certificates. University leaders must,

therefore, focus on human capital development in content design and instructional design as well as instructor proficiency to facilitate these processes. This means perhaps full recruitment plans for skilled designers and instructors, along with internal training programs to improve their skills.

It is equally important to note that efforts should be made on improving infrastructure – as in internet services. Reliable internet access is the first basic requirement for micro-credentialing to be successful. Developing teaching materials for micro-credentials often involves interactive video, which means providing studios with suitable facilities in order to create quality instructional videos. On top of that, the video production hardware and other edtech also come in handy when you get to later stages of course creation as they speed up so many more aspects. Micro-credentials need clear leadership from university top management aligning the school around this territory and serious funding for effective integration. Further, we cannot forget the adequate resources to make micro-credentials a reality. In the future, interviewers would consider the prices for developing an online platform, acquiring third-party platforms like Zoom, and buying technical packages (Ahmat et al., 2021). By using these strategies, university leaders can position their institutions to seize the micro-credential opportunity – better enabling them to be agile in responding effectively and efficiently with learner reskilling/upskilling needs while also opening new windows into higher ed. Sound good? The categories which we now explore as specific research objectives provide the basis of responding and explaining these results. Such a move shows that Malaysia's endeavours appear to be seen internationally for offering micro-credential short courses. All stakeholders, especially top-level leaders and academics in the universities, must be ready to step into a new era of learning methods that will drive India towards fuelling its lifelong learning agenda.

5.6 Implication

The implications of the study outlined in the above reading reveal significant insights into the challenges and opportunities surrounding the implementation of micro-credentials in HEI. The findings underscore the need for concerted efforts from university leaders to address key gaps in human resources, facilities and infrastructures, accreditation, and leadership. Specifically, the study highlights the necessity for universities to bolster their support systems and increase the technological competency of lecturers to develop and deliver micro-credential courses effectively. Moreover, the importance of adequate infrastructure, particularly reliable internet connectivity, cannot be overstated, as it forms the foundation for successful micro-credential implementation. The study adds further weight to the importance of national and international accreditation for micro-credential programs in order to increase their status among other forms of credentials. In addition, it requires a strong leadership commitment and vision to effectively embed micro-credentials in the post-secondary environment. To harness the promise of micro-credentials in serving the changing needs of learners and navigating our fluid education system, here are five gaps to be addressed.

6 Conclusions

The successful incorporation of micro-credentials in higher education relies heavily on effective coordination among various stakeholders, including university leaders, support systems, and human resources. It is crucial to comprehend the interconnected relationships among these components to bridge the gap between theoretical concepts and practical implementation strategies. This research underscores the complexity of the challenges and emphasises the need for university leaders to reconsider their roles and perspectives within their institutions. To navigate these complexities and facilitate the seamless integration of micro-credentials, leaders must embrace innovative approaches and address different aspects of their responsibilities. The findings from this study, gathered through a thorough analysis of data from university leaders, offer valuable insights into both the opportunities and challenges associated with micro-credential implementation in higher education. Through proactive measures and collaborative efforts, university leaders can drive meaningful change and position their institutions as pioneers of educational innovation and excellence. The conclusion of this study emphasises the central role of university leaders in driving the successful implementation of micro-credentials. It stresses the importance of understanding the interconnectedness of various elements within the institution. This understanding is essential for translating theoretical concepts into practical strategies. To address these challenges and facilitate a seamless integration of micro-credentials, future studies should focus on exploring university leaders' development and implementation of action plans. Additionally, there is a need for more quantitative data to enhance our understanding of this topic further.

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