From Transcripts to Competencies: A Digital CLER Framework for Malaysian Graduates

Nora'ayu Ahmad Uzir, Nurul Auni Safian, Irni Eliana Khairuddin*

Faculty of Information Science, Universiti Teknologi MARA, Puncak Perdana Campus, UiTM Selangor, 40150 Shah Alam, Selangor, Malaysia

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ABSTRACT

The growing demand for a skills-based economy in Malaysia has highlighted the limitations of traditional academic record-keeping, which often overlooks experiential learning, co-curricular involvement, and professional achievements. This study addresses these challenges by proposing a Comprehensive Learning and Employment Record (CLER) framework tailored for Malaysian university graduates. Using a qualitative research design, semi-structured interviews were conducted with five recent graduates and five professionals in information and records management to explore existing issues and expectations surrounding credential management. Thematic analysis revealed recurring challenges, including vulnerability of physical documents, difficulties in retrieving records, inefficiencies in verification, and the lack of interoperability across institutions. Findings also highlighted the potential of emerging technologies such as blockchain, digital credentialing platforms, and cloud-based solutions to enhance security, accessibility, and self-sovereignty in record management. Drawing from these insights, the study presents a conceptual CLER framework that integrates academic, co-curricular, and professional records into a centralized, verifiable, and learner-owned platform. The proposed framework not only improves graduates' ability to demonstrate holistic competencies but also streamlines institutional processes and supports employer decision-making. Overall, this research contributes a contextualized solution to enhance graduate employability, institutional efficiency, and Malaysia's transition to a digital, skills-driven economy.

Keywords: Comprehensive Learning and Employment Record (CLER), Graduate employability, Academic credential management, Blockchain in education, Malaysian higher education.

INTRODUCTION

The global workforce is undergoing rapid transformation, driven by technological innovation, globalisation, and the increasing emphasis on skills-based economies. Employers today expect graduates to demonstrate not only academic qualifications but also transferable skills, experiential learning, and professional competencies acquired beyond formal classrooms. This shift poses a significant challenge for higher education systems, particularly in Malaysia, where traditional methods of recording student achievements are fragmented and often fail to capture the holistic profile of graduates (World Economic Forum, 2020; Braxton et al., 2022).

Conventional records, such as transcripts and certificates, provide only partial evidence of student capabilities. They typically exclude valuable experiences, including internships, co-curricular involvement, leadership roles, and industry certifications. As a result, Malaysian graduates often struggle to present a comprehensive portfolio of their achievements, limiting their competitiveness in the labour market. At the same time, employers face difficulties verifying records scattered across institutions and stored in inconsistent formats, which prolongs recruitment processes and creates mismatches between talent supply and industry demand (Learning Economy Foundation, 2020).

To address these challenges, the concept of a Comprehensive Learning and Employment Record (CLER) has emerged internationally. CLER consolidates academic achievements, co-curricular activities, work experience,

and skills into a unified and verifiable digital record (American Workforce Policy Advisory Board, 2020). By granting learners ownership over their records, such frameworks enhance portability, transparency, and employability outcomes. Evidence from countries that have piloted CLER models demonstrates benefits for graduates, institutions, and employers, including streamlined credential verification, improved talent matching, and greater recognition of lifelong learning (Cederquist, Fishman, & Teasley, 2022).

However, the Malaysian context presents unique challenges. Existing platforms, such as MyPortfolio, introduced by the Ministry of Higher Education, and global tools like LinkedIn, provide partial solutions but lack the standardisation, verification, and interoperability needed for nationwide adoption. Moreover, Malaysian universities continue to rely heavily on paper-based documentation and siloed digital systems, limiting graduates' ability to access and share records after graduation. These limitations highlight the need for a locally contextualised CLER framework that considers national education policies, labour market requirements, and levels of digital readiness.

This study responds to that need by proposing a CLER framework tailored for Malaysian university graduates. Using a qualitative approach, semi-structured interviews were conducted with graduates and professionals experienced in records management. Thematic analysis of the data revealed persistent challenges, such as vulnerability of physical documents, delays in record retrieval, digital security concerns, and low awareness of secure storage practices. The findings also identified blockchain, cloud-based storage, and digital credentialing platforms as viable solutions for creating secure, accessible, and learner-owned systems.

The objectives of this research are twofold: first, to investigate the factors contributing to the establishment of a CLER framework; and second, to design a framework that supports Malaysian graduates in a skills-driven economy. Two research questions guide the study: (a) What are the key factors influencing the establishment of a CLER framework? and (b) How can the framework be designed to enhance employability among Malaysian graduates?

The significance of this study is threefold. Academically, it contributes to the literature on digital credentialing and record management, which remains underexplored in Malaysia. Practically, it provides insights for higher education institutions to modernise record-keeping practices and align them with industry needs. From a policy perspective, it supports national strategies to improve graduate employability and advance Malaysia's transition towards a digital economy.

The remainder of this article is organised as follows: the next section reviews relevant literature on record management, experiential learning documentation, and CLER initiatives; the methodology section outlines the qualitative research design; the findings section presents key themes from the interviews; and the discussion interprets these findings in relation to the proposed framework. The article concludes with implications for practice, policy, and future research.

In summary, this study addresses the fragmentation of academic and employment records in Malaysia by proposing a contextualised CLER framework. The framework aims to empower graduates, reduce inefficiencies, and bridge the gap between education and employment, thereby supporting Malaysia's development as a resilient and skills-based economy.

LITERATURE REVIEW

Managing Student Records in Higher Education

Student records are central to university administration, accreditation, and accountability. They typically include enrolment details, grades, transcripts, and graduation certificates, which are used by employers, policymakers, and students themselves for decision-making. Traditionally, many institutions in Malaysia have relied on paper-based record systems or fragmented digital platforms, which create inefficiencies in storage, retrieval, and verification (Eludire, 2011). Even where universities employ automated student information systems, these systems often focus on academic data and neglect co-curricular or experiential records (Samsudin, 2015). This narrow scope limits the ability of institutions to provide a comprehensive view of graduates' competencies.

Records management frameworks emphasise systematic control over the creation, use, and disposition of records (ISO 15489-1, 2001). In education, effective systems must capture a wide range of learning experiences to support evaluation and accreditation (ACGME, 2021). However, in practice, universities in Malaysia face challenges of duplication, data silos, and restricted access to records post-graduation. These issues highlight the need for more integrated approaches that can accommodate lifelong learning and employability needs.

Individual Responsibility in Record Management

While institutions issue formal records, individuals are often responsible for maintaining and presenting them throughout their careers. Research shows that many graduates struggle with this responsibility, frequently misplacing or damaging certificates and relying on vulnerable storage methods such as physical folders or unencrypted digital copies (Djabatey & Nartey, 2012; National Archives, 2020). These risks are amplified in contexts where graduates need to provide multiple documents for job applications or international opportunities.

Best practices suggest combining physical safeguards with digital solutions such as encrypted storage and cloud-based backups (Edraw, 2022). However, awareness of such practices remains limited, particularly among students transitioning into the workforce. This gap underscores the importance of institutional and national interventions, such as promoting digital credentialing platforms and portfolios, to help graduates maintain secure and verifiable records.

Comprehensive Learning and Employment Record (CLER)

The Comprehensive Learning and Employment Record (CLER) has been introduced globally as a mechanism to consolidate academic and experiential learning into a unified, verifiable record (American Workforce Policy Advisory Board, 2020). Unlike conventional transcripts, CLER includes co-curricular activities, internships, competencies, and digital badges, enabling learners to demonstrate a fuller range of skills and achievements (Laurie Todd, 2021). By doing so, CLER not only benefits learners but also employers, who can make more informed recruitment decisions, and institutions, which can better demonstrate graduate outcomes.

Studies have highlighted both the promise and limitations of CLER initiatives. For example, Cederquist, Fishman, and Teasley (2022) showed that hiring managers value broader learning evidence but also raise concerns about consistency and credibility.

Similarly, Ocheja, Flanagan, and Ogata (2021) identified interoperability and privacy as key barriers to adoption across institutions. While blockchain has been proposed as a solution to verification and trust issues, its implementation remains limited in developing contexts.

For Malaysia, these insights indicate that while CLER can offer significant advantages, local adaptation is essential. Existing reliance on paper-based systems, institutional silos, and uneven digital readiness means that imported models cannot be applied directly. Instead, a contextualised framework is required that integrates global best practices with local realities.

Comparable Platforms

Several platforms currently provide partial functions of CLER. MyPortfolio, developed by the Ministry of Higher Education, allows students to document academic and extracurricular achievements but is limited in scope and accessibility post-graduation. LinkedIn, widely used in Malaysia, supports professional networking and skill endorsements but lacks formal verification, leading to trust concerns (David, 2019).

In contrast, CLER emphasises standardisation, verification, and comprehensiveness. It incorporates both academic and experiential records while ensuring institutional validation. This makes CLER more reliable for employers and more empowering for graduates. However, Malaysia has yet to implement a nationwide system that integrates these features, making the development of a local framework timely and necessary.

Technological Approaches

Advancements in technology provide opportunities to modernise record-keeping. Blockchain offers tamper-proof and transparent verification of credentials, reducing risks of fraud and forgery (Learning Economy Foundation, 2020). Cloud storage enables centralised and accessible management of records, ensuring continuity even after graduation (Jain et al., 2019). Digital credentialing platforms enhance the visibility of non-traditional learning, such as online courses and micro-credentials, which are increasingly important in today's job market (Gendron et al., 2016).

Despite these advantages, challenges remain in implementation. Blockchain systems require significant technical expertise and infrastructure, while cloud platforms raise questions about data privacy and governance. Therefore, the adoption of these technologies in Malaysia must be carefully planned to ensure scalability, security, and inclusivity.

Fragmentation of Records

A recurring challenge in record management is fragmentation. Traditional transcripts focus narrowly on grades, ignoring co-curricular and professional experiences (Braxton et al., 2022). Employment records are similarly fragmented across organisations, creating difficulties in compiling a comprehensive profile. In Malaysia, this fragmentation exacerbates graduate employability issues, as employers cannot easily assess candidates' holistic competencies (Macfadyen et al., 2014).

Addressing this challenge requires standardised, interoperable systems that can consolidate diverse forms of learning and employment evidence. A CLER framework has the potential to overcome fragmentation by unifying academic, professional, and experiential records into a single, verifiable platform.

Potential Benefits of CLER

A well-designed CLER framework offers multiple benefits. For graduates, it enhances employability by providing a holistic and verifiable record of competencies. For employers, it reduces recruitment inefficiencies and ensures greater confidence in credential authenticity. For institutions, it aligns record-keeping with accreditation requirements and supports transparency in graduate outcomes. At the national level, CLER contributes to workforce development and supports transitions to a skills-based economy (Jain & Sharma, 2017).

In Malaysia, the adoption of a contextualised CLER framework could reduce labour market mismatches and promote economic mobility. By empowering graduates to manage and share their records, CLER enhances both individual agency and systemic efficiency.

METHODOLOGY

Research Design

This study employed a qualitative research design to explore the challenges and opportunities in developing a Comprehensive Learning and Employment Record (CLER) framework for Malaysian university graduates. A qualitative approach was chosen because it allows for in-depth exploration of participants' experiences, perceptions, and expectations, which are essential for designing a framework responsive to local needs (Merriam & Tisdell, 2016). The study was structured as a case-based inquiry, focusing on the lived experiences of graduates and professionals involved in records and data management.

Data Collection

Semi-structured interviews served as the primary method of data collection. This technique enabled the researcher to balance consistency with flexibility, ensuring that core themes were addressed while also allowing participants to elaborate on issues of personal relevance (Kvale & Brinkmann, 2015). Two groups of participants were targeted:

1. **University graduates** who completed their studies within the past five years and experienced challenges in managing academic or employment records.

2. **Professionals** with expertise in academic data systems, records management, or credential verification.

In total, ten participants were recruited—five graduates and five professionals—using purposive sampling. This approach ensured that the selected individuals had direct experience with the issues under investigation.

Interviews were conducted in December 2023, both virtually via Google Meet and face-to-face where feasible. Each session lasted between 50 minutes and one hour and was audio-recorded with participant consent. Interviews were guided by open-ended questions addressing challenges in credential management, storage methods, and potential technological solutions.

Sampling Criteria

To maintain focus and rigour, inclusion and exclusion criteria were applied. Eligible graduates were required to be Malaysian citizens with a recognised university qualification obtained within the past five years. Professionals were required to have at least three years of experience in records or data management. Individuals without relevant experience or proficiency in English or Malay were excluded.

Ethical Considerations

Ethical approval was obtained from Universiti Teknologi MARA's Research Ethics Committee. All participants were briefed on the purpose of the study, their rights to confidentiality, and the voluntary nature of their participation. Written informed consent was secured prior to data collection. To ensure anonymity, participants are identified only by codes (e.g., P1, P2) in the reporting of findings.

Data Analysis

Interview recordings were transcribed verbatim and analysed using Braun and Clarke's (2006) six-phase thematic analysis framework. The analysis process included:

1. Familiarisation with the data through repeated reading of transcripts.

2. Generating initial codes to capture meaningful segments.

3. Grouping codes into broader themes.

4. Reviewing themes against the dataset for coherence.

5. Defining and naming themes with a clear scope.

6. Producing the final narrative with supporting quotations.

ATLAS.ti software was employed to support coding and organisation of data. This facilitated systematic analysis and ensured transparency in the identification of patterns and relationships.

FINDINGS

The study sought to explore the challenges of managing academic and experiential records, factors influencing storage methods, and technological approaches for credential management. Data were gathered from interviews with ten participants: five Malaysian graduates and five professionals in records and data management. Thematic analysis revealed three overarching themes: (1) challenges in managing records, (2) factors influencing storage practices, and (3) technological solutions. Direct quotations from participants are presented to illustrate these themes.

Challenges in Managing Academic and Experiential Records

Physical Vulnerability of Certificates

Graduates consistently reported that physical certificates were fragile and prone to damage. Common problems included fading ink, mold, and tears caused by poor storage or environmental conditions.

“I once spilled water on my certificates by accident, and some of them got wrinkled and smudged.” [Graduate, P2]

“My certificates were stored in a drawer for years, and when I took them out, I noticed that the ink had faded, and there was some mold on the edges.” [Graduate, P3]

“I had a certificate damaged in a flood. It was soaked, and the ink smudged completely, making it unreadable.” [Graduate, P5]

Such incidents reduced the usability of documents and raised doubts about authenticity during verification. Several respondents explained that damaged certificates delayed their applications for jobs or furthering their studies.

Delays in Job Applications

Difficulties in retrieving records also contributed to missed opportunities. Some graduates reported that their certificates were stored in their hometowns, making it impossible to meet urgent application deadlines.

“There was a job that required immediate submission of my degree certificate, but since it was stored at my hometown and I couldn’t retrieve it in time, I was disqualified.” [Graduate, P3]

“Without timely access to my academic credentials, I missed out on several job opportunities.” [Graduate, P2]

Employers echoed these frustrations, noting that damaged or missing records often required manual verification with universities, slowing recruitment.

Digital Vulnerabilities

While digital storage offered convenience, participants described challenges such as malware, device loss, and accidental deletion.

“My laptop was hacked with ransomware, and I lost all my scanned certificates. Since I didn’t back them up, I had nothing left.” [Graduate, P4]

Professionals confirmed that digital risks were often underestimated by graduates. One records manager stated:

“Many students just keep copies on their phones or laptops. They don’t realise the risk if the device is stolen or corrupted. There is no encryption or proper backup.” [Professional, P8]

Factors Influencing Storage Practices

Peer and Social Influence

Storage behaviours were shaped by peer and family practices.

“I used to see my parents keeping all important documents in a folder at home. I followed the same, but this method doesn’t really prepare me for digital requirements.” [Graduate, P1]

Peers also played a role in encouraging digital practices:

"My friends told me to scan everything and upload to Google Drive. At first, I didn't bother, but when I saw one of them lose a certificate, I started using cloud storage too." [Graduate, P2]

Awareness and Training

Awareness programs were scarce, but those who attended digital literacy workshops were more likely to use modern tools.

"During university, there was a session about e-portfolios. That's when I realised I could store not only certificates but also project reports and co-curricular activities. It helped me prepare for job interviews." [Graduate, P4]

Professionals noted the absence of structured guidance across most institutions.

Early Habits

Participants who developed strong record-keeping habits during school years tended to continue them.

"Since secondary school, I was told to keep every certificate safely. It became a habit, but it's all still in physical form, which is not enough now." [Graduate, P1]

Technological Approaches to Credential Management

Digital Credentialing Platforms

Eight participants strongly endorsed digital credentialing systems, particularly those issuing tamper-proof badges or certificates.

"Digital certificates with QR codes or blockchain stamps are very helpful. Employers can scan and verify immediately without contacting the university." [Professional, P7]

Graduates felt these platforms reduced anxiety about document loss:

"If everything is stored digitally by the university, I don't need to worry about floods or accidents. I can just share the link with employers." [Graduate, P5]

Blockchain Technology

Seven participants highlighted blockchain's value in ensuring authenticity.

"Blockchain can prevent fake certificates. Once the record is on the chain, no one can change it. It gives trust to employers." [Professional, P9]

However, concerns were raised about cost and institutional readiness:

"The technology is excellent, but can Malaysian universities afford it? We need infrastructure and training before it can work." [Professional, P10]

Cloud-Based Storage

Nine participants emphasised the accessibility of cloud storage.

"When I applied for jobs abroad, having everything on Google Drive made it so much easier. I could access documents anytime." [Graduate, P3]

At the same time, data privacy was a concern:

"Cloud storage is good, but who owns the data? Students need assurance that their personal information is safe." [Professional, P8]

Electronic Transcript Exchange Systems

Six participants mentioned transcript exchange platforms as an efficient solution for direct verification between universities and employers.

"If institutions can send transcripts directly to employers, it will reduce fraud and save time. But currently, every university has its own system." [Professional, P6]

DISCUSSION

This study explored the challenges Malaysian graduates face in managing academic and experiential records, the factors influencing their storage practices, and the potential role of technology in addressing these challenges. The findings provide valuable insights into the realities of record management in Malaysia, which are consistent with and extend prior research.

Challenges in Record Management

The evidence shows that both physical and digital record systems are inadequate. Paper-based documents were frequently damaged by humidity, floods, or mishandling, while digital records were lost through malware or device corruption. These findings echo Eludire (2011) and Jain et al. (2019), who noted that unprotected systems—whether physical or digital—remain vulnerable. The consequence of these weaknesses was evident in missed job opportunities and delays in verification, reinforcing Macfadyen et al.'s (2014) argument that fragmented records directly undermine employability.

Social and Behavioural Influences

The study also demonstrated that personal record-keeping practices are shaped by social norms and early habits. Graduates who followed parental models of storing documents in physical folders were slow to adopt digital alternatives, while peers encouraged practices such as scanning and cloud storage. These findings extend Djabatey and Nartey's (2012) observations by showing how cultural and social contexts shape credential management. The absence of structured institutional training was particularly notable, confirming Edraw's (2022) argument that effective record management requires both tools and awareness.

Technological Pathways

Participants expressed strong support for blockchain, cloud storage, and digital credentialing platforms. Blockchain was valued for its immutability and ability to prevent forgery, consistent with Jain and Sharma (2017). Cloud storage was praised for accessibility, though privacy concerns remain (Gendron et al., 2016). Digital badges and electronic transcript systems were identified as practical steps toward streamlining verification (Laurie Todd, 2021).

Taken together, these insights highlight the need for an integrated and contextualised solution. Such a solution must combine the strengths of emerging technologies with governance mechanisms that ensure trust, interoperability, and learner empowerment. The next section presents the CLER framework as the practical contribution of this study.

Implications

Theoretical Implications

This study contributes to the literature by extending CLER research into the Malaysian context, where empirical work has been limited. It demonstrates how social, cultural, and infrastructural factors influence credential

management, offering a more holistic perspective than existing studies that focus primarily on technology or institutional processes.

Practical Implications

Drawing from the findings and building on the model presented in Figure 1 , the Comprehensive Learning and Employment Record (CLER) framework is structured around three key domains:

1. Academic Records – These include transcripts, grades, and degree qualifications issued by universities. They form the foundation of a graduate's formal achievements.

2. Co-Curricular Records – These capture experiences such as leadership roles, student organisation activities, volunteer work, and other non-academic contributions that demonstrate transferable skills.

3. Professional Records – These encompass industry certifications, internship evaluations, employment history, and continuous professional development activities.

Figure 1: Comprehensive Learning and Employment Record (CLER) framework

These domains are integrated within a technological infrastructure composed of blockchain for authenticity and immutability, cloud storage for accessibility and scalability, and digital credentialing platforms for generating verifiable digital badges and QR-coded certificates. Together, these tools reduce fragmentation, prevent fraud, and provide graduates with immediate access to their credentials.

Governance is embedded in the framework through learner ownership, institutional validation, and interoperability. Learners are empowered to control how their records are shared, universities are responsible for validating issued credentials, and standardised protocols ensure records can be exchanged across institutions and employers.

Finally, the framework is supported by user-friendly interfaces: a graduate dashboard to manage and share credentials, an employer portal for instant verification, and an institutional portal to issue and update records. By consolidating diverse achievements into one secure and verifiable system, the CLER framework ensures that graduates can present a holistic, trustworthy profile to employers, thereby bridging the gap between education and employment in Malaysia.

Policy Implications

The framework also aligns with Malaysia's national digital transformation and employability agendas. Policymakers can use it as a blueprint to develop standards for credential issuance, ensure data protection, and promote nationwide interoperability. It also provides a foundation for cross-sector collaboration, linking universities, employers, and government agencies in a unified digital ecosystem.

CONCLUSION

This study set out to examine the challenges surrounding credential management among Malaysian university graduates and to explore the potential of a Comprehensive Learning and Employment Record (CLER) as a contextualised solution. Drawing on interviews with five graduates and five professionals in records and data management, the findings highlighted multiple systemic weaknesses in the current approach to academic and professional documentation. These included the fragility of paper-based certificates, inefficiencies in retrieval and verification, and the fragmentation of records across academic, co-curricular, and professional domains.

In addition to these structural challenges, the study revealed important behavioural and social influences on record-keeping practices. Graduates tended to replicate parental or peer habits, often without sufficient awareness of secure storage practices. Institutions provided limited formal guidance, leaving learners to rely on

informal strategies that frequently proved inadequate in the face of digital risks such as malware, device theft, or accidental deletion.

Despite these challenges, the study found significant optimism among both graduates and professionals regarding the role of emerging technologies. Blockchain was valued for its potential to prevent forgery and streamline verification; cloud storage was appreciated for its accessibility and scalability; and digital credentialing platforms were endorsed for their ability to document a wider range of achievements. However, participants also raised concerns about cost, readiness, and governance, indicating that any solution must balance technological innovation with practical feasibility.

Taken together, the findings emphasise that credential management in Malaysia requires more than incremental improvements to existing systems. Instead, it calls for a holistic and integrated approach that not only digitises records but also ensures their authenticity, accessibility, and interoperability across institutions and employers. The study, therefore, proposed that within the Implications section, a CLER framework should be tailored to the Malaysian context. This framework consolidates academic, co-curricular, and professional records into a learner-owned platform supported by blockchain, cloud storage, and interoperable systems.

The conclusion that emerges is twofold. First, Malaysia's current record management practices are insufficient for a skills-driven economy where employability depends on transparent, comprehensive, and verifiable documentation of competencies. Second, a CLER framework provides a feasible and sustainable pathway to address these limitations, provided that universities, employers, and policymakers collaborate in its design and implementation.

The contributions of this study are significant at multiple levels. Theoretically, it extends the global discourse on CLER into a developing country context, demonstrating the interplay of technological, social, and institutional factors in shaping credential management. Practically, it provides higher education institutions with a blueprint for modernising record systems and offers employers a model for more efficient recruitment. From a policy perspective, it aligns with national digital transformation strategies, highlighting how a unified CLER system can support graduate employability and economic resilience.

At the same time, the study acknowledges its limitations. The small, qualitative sample limits the generalisability of findings, and future research should employ larger, more diverse datasets to validate the framework. Quantitative measures of employability outcomes, longitudinal studies on career progression, and cross-country comparisons would further enrich the evidence base.

In closing, this study underscores that credential management is not merely an administrative task but a strategic priority for Malaysia's higher education and labour market. By moving toward a CLER framework, Malaysia can empower graduates to showcase their holistic competencies, enable employers to make better-informed hiring decisions, and support institutions in demonstrating accountability. Ultimately, the adoption of CLER has the potential to transform how learning and achievement are recognised, thereby bridging the gap between education and employment in a digital, skills-based economy.

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