



COMMONWEALTH *of* LEARNING

**Mainstreaming
Technology-Enabled
Learning:
Strategies from UMS**

Structured Abstract



PROBLEM:

Universiti Malaysia Sabah (UMS) faced challenges in integrating information and communication technologies (ICT) into teaching and learning because of poor Internet connectivity, limited exposure to digital pedagogy, a shortage of open resources and inconsistencies across faculties. These issues affected both students and lecturers, limiting participation, course quality and institutional capacity for digital transformation.



SOLUTION:

UMS adopted the Commonwealth of Learning's (COL) policy-capacity-technology (PCT) model to guide the implementation of ICT. Key interventions included the introduction of blended learning (BL), massive open online courses (MOOCs), open educational resources (OER) and open textbooks; capacity building on digital education leadership; and institutionalising technology-enabled learning (TEL) through a formal TEL policy aligned with the Malaysia Education Blueprint 2015–2025.



TARGET GROUP:

The initiative targeted lecturers, students and institutional leaders across 14 faculties, three institutes and three centres.



RESOURCES REQUIRED:

The implementation of ICT required policy frameworks, digital infrastructure, capacity development and external partnerships. UMS leadership and the Ministry of Higher Education offered encouragement, and COL supplied technical assistance.



RESULTS:

Between 2018 and June 2025, 91% of 1,805 courses across all faculties at UMS adopted a blended mode of teaching. In addition, UMS developed MOOCs for national and international audiences and produced OER and inclusive open textbooks. Lecturers were trained in digital pedagogy, students accessed open resources and flexible learning and university leaders benefited from policy guidance, benchmarking and international collaborations.



LESSONS LEARNED:

Five lessons emerged: policy alignment is critical, capacity building must be continuous, engagement depends on both connectivity and pedagogy, external partnerships build resilience but must lead to sustainability, and inclusivity and openness expand impact. A key takeaway is the need to remain open to disruptive technologies such as artificial intelligence (AI).



CHALLENGES:

Key challenges included poor connectivity, low student motivation, occasional technical difficulties and the need for sustained staff training. Institutional scaling posed quality assurance challenges. The challenges were addressed through infrastructure upgrades, interactive pedagogical design, technical support, recognition awards and policy alignment with the National e-Learning Policy (Dasar e-Pembelajaran Negara — DePAN) and COL benchmarking.



SUSTAINABILITY:

Long-term sustainability is ensured through the institutionalisation of the TEL policy, continuous staff development, reliable infrastructure and internal financial planning. The promotion of OER and open textbooks, partnerships with universities and industry (e.g., Google, Apple) and ongoing work on generative AI (GenAI) in teaching and learning position UMS as a future-oriented institution committed to digital transformation.

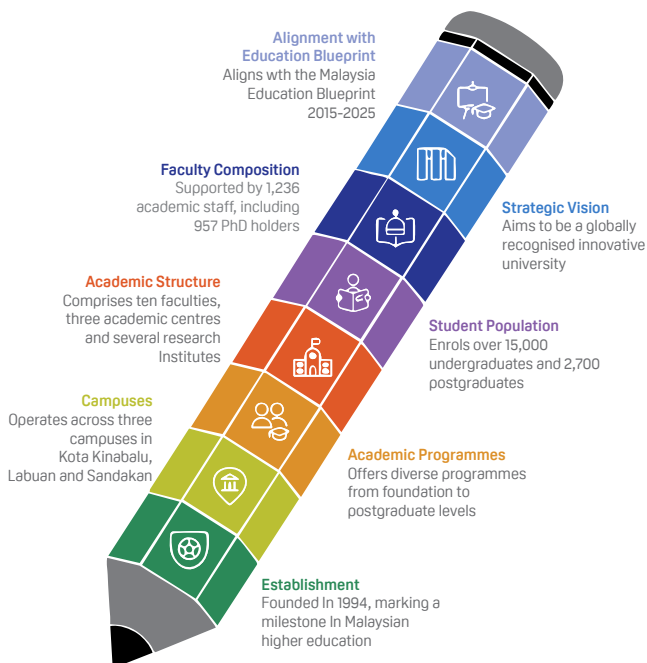


KEYWORDS:

Generative AI, open educational resources, policy-capacity-technology model, technology-enabled learning, Universiti Malaysia Sabah

Introduction

The Universiti Malaysia Sabah (UMS), established on 24 November 1994, is Malaysia's ninth public university, with campuses in Kota Kinabalu, Labuan and Sandakan. It offers a foundation science programme, 64 undergraduate programmes and a wide range of postgraduate studies through its ten faculties, three academic centres and several research institutes. Currently, UMS serves over 15,000 undergraduates and 2,700 postgraduates. They are supported by 1,236 academic staff, 957 of whom have a PhD. In accordance with its vision of becoming a globally recognised innovative university, UMS prioritises academic excellence, research and societal engagement in line with the Malaysia Education Blueprint 2015–2025 (Ministry of Higher Education Malaysia, 2015).



Overview of UMS.

The Centre for e-Learning, established in 2017, has been entrusted with leading technology-enabled learning (TEL) initiatives at UMS. This centre plays a pivotal role in institutionalising digital education by promoting digital pedagogy, developing open educational resources (OER) and strengthening academic staff's capacity in digital teaching and learning. TEL is not only a response to global technological shifts but also a deliberate strategy to future-proof UMS graduates by providing them with 21st-century skills.

Prior to the systematic adoption of TEL, UMS faced several challenges common among higher education institutions in Malaysia, particularly East Malaysia — for example, heavy reliance on conventional face-to-face pedagogy, limited exposure to digital teaching methods and inadequate Internet access and infrastructure, especially in rural Sabah. The Covid-19 pandemic amplified these challenges and created an urgent need for scalable, flexible and student-centred approaches to teaching and learning.

The Commonwealth of Learning (COL) has been a strategic partner in supporting UMS's adoption and implementation of TEL. COL's structured approach, which emphasises preparation, development and maturation, provided a framework for UMS to move from ad hoc digital practices to a more mature and institutionalised TEL ecosystem.

Between 2018 and June 2025, UMS accelerated TEL adoption in response to the national digitalisation priorities, post-pandemic shift to online learning and demand for equitable access to education. Using multiple tools — Moodle-based learning management system (LMS), blended learning, massive open online courses (MOOCs), OER and the OpenBook@UMS repository — UMS expanded digital access, enhanced student engagement and increased institutional visibility at national and international levels.

This case study documents UMS's implementation of TEL during this period. It outlines the interventions introduced, the challenges addressed and the results achieved.

It also highlights the successes and lessons learned and looks at sustainability strategies, providing evidence of UMS's commitment to transforming teaching and learning while contributing to the wider Commonwealth discourse on digital education.

“Technology-Enabled Learning has become a cornerstone of UMS's academic transformation. With a strong TEL policy in place, we have successfully mobilised all faculties towards more inclusive digital innovation.”

— Deputy Vice-Chancellor
(Academic and International), UMS

TEL Intervention

UMS used the COL policy-capacity-technology model for TEL (Mishra & Panda, 2020) to structure its TEL interventions. It implemented a comprehensive ecosystem built around four platforms — iTEL, MOOCs, OER and OpenBook@UMS — supported by a strong policy framework and continuous professional development. Each intervention was designed to directly address a specific challenge while ensuring long-term sustainability.

TEL POLICY

UMS institutionalised TEL through the adoption of a formal TEL policy, which provided strategic direction for integrating technology into teaching and learning across faculties, institutes and centres. This ensured that digital innovation was embedded in governance structures, aligned with the Malaysia Education Blueprint 2015–2025 and benchmarked against international best practices. By linking TEL to policy, UMS ensured continuity even in the face of leadership transitions and elevated TEL from project-based initiatives to a permanent institutional practice.

CAPACITY BUILDING THROUGH C-DELTA AND DEPAN

Capacity building formed the backbone of UMS's TEL interventions. With COL's support, UMS implemented the Commonwealth Digital Education Leadership Training in Action (C-DELTA) programme, which equipped lecturers and students with the digital competencies they will need to thrive in technology-enabled environments. The Ministry of Higher Education's National e-Learning Policy (Dasar e-Pembelajaran Negara — DePAN) guided structured training for academic staff in integrating digital pedagogy into teaching. COL provided training on blended course design and development and OER and open textbook development.

Together, the programmes addressed the challenge of lecturers' limited confidence in and exposure to digital pedagogy, fostering a culture of continuous professional growth. One C-DELTA alumnus reflected, "Through the C-DELTA training, I acquired new skills to integrate digital pedagogy into my lectures. This boosted my confidence and made my teaching process more interactive."

WORKSHOPS AND BENCHMARKING ACTIVITIES

Structured workshops and benchmarking exercises, supported by COL, reinforced the institutionalisation of TEL. They began with policy development workshops in 2018, followed by training in blended course design, OER repositories and benchmarking assessments in 2019 and 2020. These activities helped UMS address gaps in policy, pedagogy and resource availability. Benchmarking against international standards validated UMS's progress and ensured its TEL practices were comparable to those of global leaders in higher education.

CORE TEL PLATFORMS

UMS operationalised TEL through four core platforms, each mapped to specific challenges and opportunities:

- **iTEL¹ (formerly SmartUMS):** By 2025, UMS's official Moodle-based LMS supported 1,805 courses across 14 faculties, three institutes and three centres. It addressed scalability and ensured that both blended and fully online learning became standard across disciplines.
- **MOOCs²:** Developed for national and international platforms, MOOCs expanded outreach beyond campus, offering flexible access to learners across Malaysia and abroad.
- **OER³:** Using a DSpace repository, UMS created, adapted and disseminated OER,

¹ See <https://itel.ums.edu.my/>

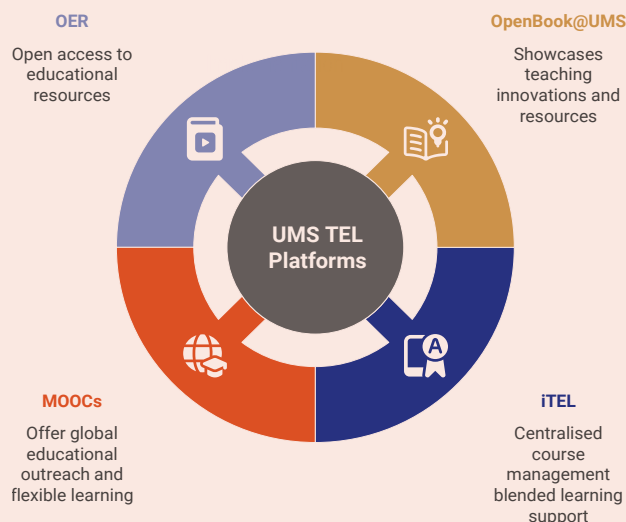
² See <https://mooc.ums.edu.my/>

³ See <https://oer.ums.edu.my/>

reducing costs and barriers while widening access to learning materials.

- **OpenBook@UMS⁴:** This digital platform hosts teaching resources and inclusive open textbooks. It promoted knowledge-sharing, reduced duplication and positioned UMS as a contributor to the global open education movement.

This comprehensive approach demonstrates how higher education institutions can move beyond fragmented initiatives to build sustainable, future-proof digital education systems.



UMS's TEL platforms.

Implementation

The implementation of TEL at UMS was based on a structured approach that combined national policy alignment, institutional capacity building, digital infrastructure development and international collaboration. The Centre for eLearning led the implementation and ensured that all faculties, institutes and centres systematically adopted technology as part of teaching and learning. COL played a vital role by using a phased approach — preparation, development and maturation (Sankey & Mishra, 2019) — to guide the implementation.



TEL-related activities implemented.

PHASE 1: PREPARATION

The preparation phase focused on establishing a foundation for TEL through governance and policy alignment. UMS conducted a TEL baseline survey to assess digital readiness, infrastructure gaps and pedagogical practices across faculties (Seng et al., 2018). It then drew on the findings to develop a formal TEL policy to provide strategic direction and institutional alignment with national and international priorities. To support these policy efforts, capacity-building activities were offered to academic staff to help familiarise them with digital pedagogy and leadership. Collectively, these initiatives ensured that UMS entered the development phase with evidence-based insights and a policy framework that safeguarded continuity and sustainability.

PHASE 2: DEVELOPMENT

The development phase centred on capacity building, digital infrastructure enhancement and the creation of OER. Academic staff received training in blended course development, which equipped them with the skills to design and deliver student-centred, technology-enhanced teaching. In addition, both lecturers and students benefited from the C-DELTA programme, which strengthened their digital competencies and leadership skills for technology-enabled environments.

⁴ See <https://openbook.ums.edu.my/>

Simultaneously, UMS invested in strengthening its ICT infrastructure and Wi-Fi connectivity and scaled its Moodle-based LMS to support up to 20,000 concurrent users, rather than 500. A significant milestone was the use of the open source DSpace platform to establish an OER repository for the storage, sharing and reuse of OER across faculties. These developments expanded access, improved teaching practices and equipped the institution with the capacity to scale TEL effectively.

PHASE 3: MATURATION

The maturation phase consolidated and scaled TEL practices, embedding them in institutional culture and quality assurance systems. Benchmarking exercises were carried out to assess progress in TEL against international standards. The results were used to validate progress and provide guidance for continuous improvement. A community of practice⁵ was established so that academics could share their

expertise and maintain the momentum of digital innovation, and OpenBook@UMS provided a platform to host inclusive digital learning resources and institutional innovations, positioning UMS as a recognised contributor to the global open education movement. Together, these efforts strengthened quality assurance, expanded access and ensured TEL's sustainability across the university ecosystem.

In conclusion, the implementation of TEL at UMS was guided by national policy alignment, strengthened through systematic training and capacity building, supported by robust digital infrastructure and reinforced by COL's invaluable benchmarking, training and financial support. By targeting academics, students and institutional leaders and embedding structured monitoring processes, UMS ensured that TEL evolved from a project-based initiative to an integral part of the university's teaching and learning culture.

Results

The implementation of TEL at UMS generated positive outcomes across teaching, learning and institutional capacity building. Data from institutional monitoring between 2018 and June 2025 show steady growth in the integration of blended and online courses through iTEL, the development of MOOCs and the expansion of OER and material available on OpenBook@UMS. Collectively, these initiatives demonstrate UMS's capacity to mainstream TEL as part of its academic ecosystem.

Key outputs and outcomes of COL support for TEL implementation resulted in the following:

- implementation of a TEL policy
- development of a large number of blended courses
- setting-up of an OER repository and an open textbook platform
- 27,670 students using iTEL
- development of a TEL benchmarking and action plan

STUDENTS' PERCEPTIONS OF THE TEL IMPLEMENTATION

Students at UMS have a very positive overall perception of blended learning (BL). They highly value its flexibility, which allows them to access courses anywhere and at any time, and generally acknowledge the quality of the course design and learning experience, noting that BL enhanced their time-management and digital literacy skills. However, they also expressed a desire for more interaction and fun activities from lecturers, and sought more practical, industrial application-based content. Some also reported feeling more anxious and indicated that BL courses required more time and effort. Overall, BL led to significantly better learning performance than non-blended courses (Bhagat, 2019).

LECTURERS' PERCEPTIONS OF THE TEL IMPLEMENTATION

Lecturers at UMS generally have positive perceptions of BL, largely because of the professional training and robust institutional support they received. They reported very high satisfaction with the training they received as part of the TEL implementation, as

⁵ See <https://telcop.ums.edu.my/>

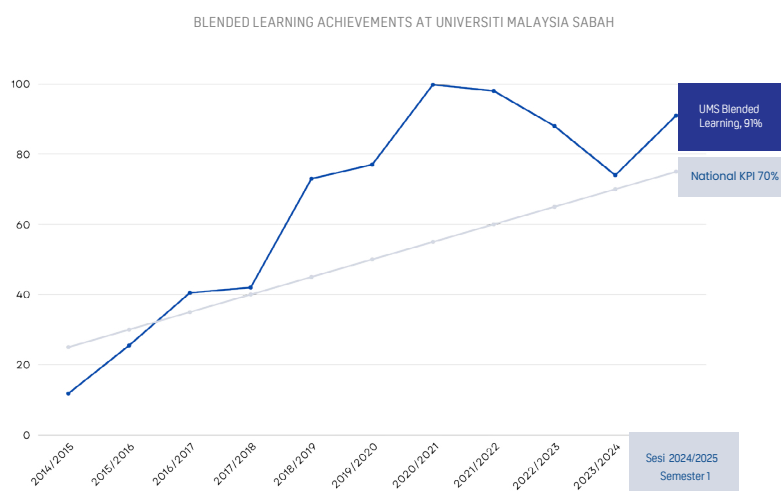
it enabled them to make full use of the iTEL platform and prepare courses in a structured manner. They found iTEL convenient and flexible, noting that it saved them time and facilitated their interaction with students at any time of day and in any location.

UMS supports BL through technical assistance, ICT devices, software licences and regular training; it presents awards for contributions to BL and has established e-learning cafés within departments. These initiatives are all underpinned by a well-established TEL policy and strong support from top management.

The lecturers identified a range of challenges, including the fact that poor Internet connections and inadequately equipped classrooms limit students' access to iTEL. They highlighted a need for increased awareness and more training programmes for their colleagues, particularly in areas such as e-content development, instructional design and ICT training, to enhance the quality of course content and design. Overall, the professional development they received was seen as having had a significant positive impact on their experience of designing and teaching BL courses (Bhagat, 2019).

INSTITUTIONAL ACHIEVEMENTS

At the institutional level, UMS has successfully expanded the number of blended and online courses across its 14 faculties, three institutes and three centres — 91% of courses at UMS are now offered as blended courses. Training programmes, workshops and benchmarking exercises supported by COL strengthened policy alignment, staff readiness and resource development. UMS's achievements reflect its capacity to scale TEL initiatives while ensuring alignment with national higher education priorities and global best practices. Its TEL benchmarking report (Mishra, 2020) revealed that it scored 3.85, on a scale of 1–5, which indicates progress towards integrating technology into teaching and learning systems. When the baseline study was conducted in 2018, the status of TEL at UMS was 123, which indicated “developing preparedness.”



Uptake of blended learning at UMS.

Challenges and Mitigation Strategies

During the process of implementing TEL at UMS, both students and lecturers encountered challenges that had to be carefully addressed to ensure sustainability. The implementation team responded with targeted mitigation strategies grounded in policy, infrastructure development and capacity building.

CONNECTIVITY AND ACCESS TO RESOURCES

A major barrier was poor Internet connectivity and limited access to digital resources. These issues disrupted participation in live sessions and limited the effectiveness of multimedia-

based learning. UMS strengthened its digital infrastructure through the institutional ICT Security Policy and Digital Strategic Plan. The Department of Information Technology and Communication provided campus-wide Wi-Fi, upgraded IT facilities, computer labs and a helpdesk. These changes enabled students without reliable Internet access at home to continue learning on campus. One student noted, “Unstable internet connectivity in rural areas often disrupts my participation in live classes. Nevertheless, campus-wide Wi-Fi and access to computer labs have helped reduce these difficulties.”

STUDENT ENGAGEMENT AND MOTIVATION

Students faced challenges in staying motivated, and many also struggled to interact with their peers in online environments. Therefore, lecturers were trained to use interactive features within iTEL such as forums, quizzes and collaborative assignments. Workshops emphasised student-centred course design to foster active engagement and a sense of community.

TECHNICAL ISSUES

Many students and teachers struggled to navigate iTEL and manage course content on the LMS. With the support of COL, UMS developed a course on learning with technology, complete with student guide, to help students (Rodrigues & Fook, 2019). Continuous technical support was provided by the Centre for eLearning through hands-on workshops and one-on-one coaching. The implementation team collaborated with developers to make iTEL more intuitive and responsive.

STAFF CAPACITY AND ABILITY

Although lecturers were willing to adopt TEL, they required structured support and recognition to use it to its full potential. UMS offered targeted workshops, one-on-one coaching in course design and recognition awards for lecturers who produced high-quality blended and online courses. This approach both built competence and motivated wider staff participation.

INSTITUTIONAL SCALING AND QUALITY ASSURANCE

The scope of the initiative — implementing TEL across 14 faculties, three institutes and three centres — made monitoring, quality assurance and maintaining consistency difficult. The TEL policy was therefore aligned with the Ministry of Higher Education's National e-Learning Policy (Dasar e-Pembelajaran Negara — DePAN) and followed COL's guidelines. This ensured consistency, quality and sustainability across all academic units.

Lessons Learned

The integration of TEL at UMS demonstrates that digital transformation in higher education requires both institutional readiness and sustained stakeholder support. Lessons learned from the initiative could be adopted by other institutions seeking to strengthen TEL.

- **Policy alignment is fundamental:** The establishment of a TEL policy and its integration into the Malaysia Education Blueprint 2015–2025 provided UMS with clear direction and coherence. Formal ICT guidelines and strategic planning ensured that infrastructure development, system security and digital services were consistent with institutional priorities. Other institutions could adopt a similar approach by ensuring that TEL initiatives are not standalone projects but are anchored in governance frameworks and national strategies.
- **Capacity building must be continuous:** Training workshops on blended learning design, OER and inclusive open textbooks significantly improved lecturers' confidence and competence. Lecturers' willingness to continue their professional development confirmed that ongoing training is an essential component of success. This lesson could be adopted by others by embedding digital pedagogy in academic development plans and linking it to career progression systems.
- **Student engagement depends on both connectivity and pedagogy:** Surveys revealed that students valued clearly written teaching materials and support from lecturers and struggled with unstable or unreliable Internet access and limited interaction. This shows that investments in infrastructure alone are insufficient. Other institutions could adopt this lesson by pairing technological improvements with active learning strategies that enhance interactivity, peer collaboration and student-centred design.
- **External partnerships build resilience but must lead to internal sustainability:** UMS benefited greatly from its collaboration

with COL, including technical assistance to implement TEL systematically. However, long-term resilience requires reducing dependency on external support by institutionalising budgets, systems and expertise. This lesson could be adopted by others by leveraging partnerships to build internal capabilities that sustain TEL beyond project funding cycles.

- **Inclusivity and openness expand long-term impact:** The development of MOOCs, open textbooks and the OpenBook repository created a culture of openness, accessibility and knowledge-sharing. These initiatives improved equity of access and positioned UMS as a contributor to global OER movements. Other institutions could

adopt this lesson by embracing open practices as a way to democratise education and extend the reach of their academic contributions.

- **Openness to disruptive technologies:** The rapid rise of generative AI (GenAI), immersive learning tools and other disruptive technologies demonstrates that TEL cannot be static. UMS recognised that embracing innovation — while developing appropriate policies and safeguards — is critical to staying relevant in a fast-changing digital landscape. Other institutions could adopt this lesson by remaining flexible and proactive in exploring disruptive technologies, ensuring they are integrated responsibly into teaching, learning and research.

Sustainability

UMS aims to sustain TEL well beyond the period of support from COL. Its experience to date demonstrates that long-term sustainability depends on embedding TEL in its culture, structures and resource planning. The following list summarises some key sustainability strategies.

- **Institutionalisation:** By establishing a formal TEL policy aligned with the Malaysia Education Blueprint 2015–2025, UMS ensured that TEL initiatives are recognised as core academic practices rather than temporary projects. This policy framework will safeguard continuity even in the event of leadership transitions and positions TEL as part of the university’s strategic mission.
- **Capacity building:** Lecturers’ readiness to adopt digital pedagogy confirms the importance of sustained training, mentoring and recognition. Integrating TEL competencies into academic promotion and reward systems will further institutionalise digital practices.
- **Technological resilience:** Continuous investment in network stability, platform development and infrastructure is vital if connectivity challenges, particularly in rural Sabah, are to be addressed. Strengthening the ICT policy ensures equitable access and reliability across faculties and campuses.
- **Adoption of AI:** AI must be embraced across all academic and administrative activities — from curriculum design and personalised learning pathways to research support, student services and institutional decision-making — and GenAI will help UMS leverage its transformative potential while safeguarding academic integrity and ethical standards. Embedding AI in daily activities will ensure that TEL remains future-ready and aligned with global higher education trends.
- **Financial planning beyond external support:** While COL funding made an important impact, UMS must progressively invest in internal resources to sustain TEL. A dedicated budget within the Centre for eLearning would secure continuity in training, content creation and system maintenance.
- **Collaboration and resource sharing:** With its development of MOOCs, open textbooks and the OpenBook repository, UMS has fostered a culture of collaboration that reduces duplication and amplifies the reach of its educational resources.
- **Partnerships and networks:** UMS plans to deepen its collaborations with Malaysian universities, regional institutions

and international stakeholders and forge strategic alliances with corporate industry partners such as Google and Apple. These collaborations will connect UMS to a wider TEL ecosystem, facilitating access to cutting-edge technologies, fostering knowledge exchange, enabling benchmarking and driving joint innovation that ensures long-term resilience and adaptability.

Way Forward

The way forward for TEL at UMS involves strategic scaling and its integration into the wider higher education ecosystem. It also involves innovation. UMS must build on the progress made between 2018 and June 2025 and continue to strengthen its leadership in digital education while responding to evolving global and national priorities.

UMS will expand blended and online learning across all faculties and campuses. This requires both the growth of course offerings through iTEL and MOOCs and the integration of digital components as a standard feature in every programme. Structured monitoring will ensure quality and identify best practices that can be replicated across disciplines.

Innovation will drive the next phase of TEL. UMS plans to encourage creativity and shared ownership of learning by enhancing the use of OER and promoting OpenBook as a platform for student-generated content. The integration of AI, learning analytics and adaptive systems into teaching will support the personalisation of learning and improve student engagement.

Continuous capacity building remains essential. While lecturers have shown readiness to pursue training, the next step is embedding digital pedagogy in career progression and recognition systems. Communities of practice and peer mentoring will strengthen collective expertise and reduce reliance on external providers.

Digital inclusivity will remain a priority. Addressing connectivity challenges, particularly for students in rural Sabah, requires collaboration with government agencies, service providers and industry partners. Updating the institutional ICT policy to reflect these priorities will ensure equitable access and sustainable resource use.

These strategies show that sustainability is not limited to financial or technical capacity; it also requires cultural transformation. By embedding TEL in policy, practice and partnerships, UMS is strengthening its role as a future-oriented institution committed to preparing graduates to meet the demands of a digital society.

UMS will deepen its partnerships with national and international stakeholders. By strengthening its collaborations with COL, the Ministry of Higher Education and regional universities, UMS can position itself as a hub for digital innovation in education. These partnerships will expand access to resources, open opportunities for benchmarking and raise UMS's global visibility.

UMS will embed TEL in its sustainability agenda. This includes reducing its environmental impact by using digital resources in place of printed materials and encouraging green ICT practices. By aligning TEL with the United Nations Sustainable Development Goals, UMS will reinforce its identity as a socially responsible institution that prepares graduates for a digital and sustainable future.

The university will develop a dedicated policy on GenAI in teaching and learning. As GenAI is already rapidly transforming education, UMS must proactively address its opportunities and risks. The proposed policy will guide the responsible integration of AI tools into pedagogy, ensure academic integrity, protect intellectual property and provide clarity on the use of AI for both lecturers and students. UMS must establish a balanced framework that encourages innovation while safeguarding ethical standards.

In sum, the way forward for TEL at UMS combines scaling, innovation, inclusivity, sustainability and proactive policy development. By embedding TEL in every aspect of academic life, UMS will ensure that technology functions not only as a tool but also as a transformative force that empowers students, lecturers and the wider community.

The university has already significantly advanced digital education, built institutional expertise and

strengthened its global positioning since 2018. By introducing a GenAI policy and fostering strategic partnerships and capacity building, UMS will be well positioned to remain flexible and resilient in the face of rapid technological change. The future of TEL at UMS is one in which digital innovation aligns with academic excellence, inclusivity and sustainability, ensuring lasting impact well beyond the project's original objectives.

In the words of Professor Datuk Dr Kasim Mansor, vice-chancellor of UMS, “UMS aspires to be a regional hub for digital innovation in education. The integration of TEL not only enhances teaching quality but also contributes to the global sustainability agenda.”

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COMMONWEALTH of LEARNING

505 Burrard Street, Suite 1650, Box 5
Vancouver, BC V7X 1M6 Canada
Phone + 1 604 775 8200 / Fax + 1 604 775 8210

 info@col.org
 www.col.org
 [@col4d](https://twitter.com/col4d)
 facebook.com/COL4D/
 instagram.com/commonwealthoflearning/

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Case study prepared by Professor Dr Soon Fook Fong, Dr Norhuda Salleh, Noor Hapipah Samat and Mohd Zulfadhlee Abdul Nasyir, Centre for e-Learning, Universiti Malaysia Sabah.

Concept and co-ordination: Dr Sanjaya Mishra.

Copy editing: Lesley Cameron.

Layout design: Ania Grygorczuk.



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